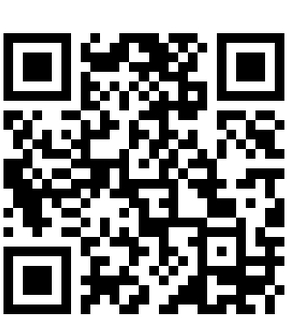
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Wakefield, Mass. H. M. Warren School, Charles E. Park, Archt., 1083 (*Reg.*)

Washington, D. C. Statuary Hall in Capitol. Benjamin H. Latrobe, Architect, 1081 (*Imp.*)

West Ham, Eng. Competitive Design for Technical Institute and Public Library. J. M. Brydon, Architect, 1089 (*Int.*)

Worcester, Mass. Competitive Design for City-hall:

Carrère & Hastings, Architects, 1071 (*Reg.*)

A. P. Cutting, Archt., 1071 (*Imp.*)

Hartwell, Richardson & Driver, Architects, 1071 (*Imp.*)

Peabody & Stearns, Architects, 1071 (*Reg.*)

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THE proposition, which has been recently made, to incorporate in Columbia University the National Academy of Design under the title of a Department of Fine-Art, is worthy of serious consideration, although it is, perhaps, not likely to be carried into effect. Whether fine-art can be taught in college; and, if so, whether all the fine-arts are equally capable of being imparted by the sort of instruction adapted to college requirements; and, supposing a university curriculum to be valuable in training artists, in what ways it can be made most valuable; — all these are questions of grave importance, which will, sooner or later, present themselves urgently to those who are seeking to develop the science of education in this country. Ever since the time of the Cæsars, the saying of Horace, that "A poet is born, not made," has been quoted to prove that great artists of all sorts must depend upon their own faculties for their success, and that academic training is rather injurious to them than otherwise. To a certain extent this notion is probably a correct one. Every great artist is, and consciously so, the interpreter to his fellow-men of ideas which came into his mind from a source apparently outside of himself. Mozart used to listen, to hear, in his inner consciousness, the melodies which he wrote down as he heard them; and Michael Angelo saw in his blocks of marble beautiful forms, which he tried to free from their veil of stone by furious attacks with chisel and hammer. Ruskin says somewhere that the capacity of an artist is proportional to the distinctness with which these visions present themselves to him; to which it should be added, that his effective power is proportional to the steadiness with which he can keep the vision before his mental sight, or, perhaps, can keep his mental sight fixed upon the vision, until he has translated it into painting or sculpture, music, poetry or architecture. Probably all true artists would agree that these mental visions, or inspirations, are not subject to any such discipline as that exercised by scholastic training. A good many people imagine that they can construct an inspiration by combining good precedents upon correct principles, and a great deal of current musical and artistic work is based upon such combinations; but the charm of these compositions vanishes in a moment, when they are compared with others really touched with the divine fire, which is, indeed, inborn. It does not, however, follow that a gift which is innate cannot be developed and strengthened by education. The vividness of an artist's conceptions is probably dependent upon a constitutional sensitiveness of the mind, which is beyond the reach of anything, perhaps, except moral influences; but vivid conceptions are of very little use to an artist who allows them to fade away before he can express them; and the intellectual force requisite for holding them before the mind is a quality which may be greatly developed by training, and it is to the development of this faculty that the higher education is, in general, directed. The thing which most obviously separates university work from that of schools is that, in the former, the student solves more difficult problems, by means of a concentration of mind more intense and prolonged, than can be expected from a school-boy; and, as the student pursues his course, problems of greater difficulty are presented to him, for the very purpose of exciting him to still greater intensity of effort. This mental effort is essentially the same, whether it is applied to holding in view the conditions and relations of a mathematical problem, or the elements of a theoretical conception in science, or the details of an artistic inspiration, and of two artists, with equal vividness of mental vision, that one must express his conceptions most successfully who can keep his mind most steadily upon them. In music this is well recognized, and, while a degree of Mus. Doc. gives no assurance that the bearer is a true artist, it does indicate that the bearer, if he hears the Muses singing to him, can listen to them intently, and interpret their songs intelligently and clearly.

IN another way, also, a liberal education is of value to an artist, in freeing him from temporary and irrelevant influences. The most liberally-educated persons are usually the most free from prejudices, and the simplest in their tastes; and no one needs more than an artist to be independent of fashions, and of the nostrums and fancies of cliques, which appeal so strongly to the half-educated, and which unquestionably affect, greatly to its injury, so much artistic work. Beyond these general effects of a liberal training, the value of which to artists ought not to be underrated, it does not seem improper for a university to give a thorough and complete technical training in any branch of fine-art. Whether the personal element, which is so powerful a factor in the usual system of studying fine-art under an accomplished master, could be retained in a college curriculum may be doubtful; but a similar personal element in the teaching of science and history is made very prominent in the German universities, and it would not be difficult to modify the system as required.

THE New York papers contain descriptions of an "entirely new and very attractive plan" for school buildings, which has so much pleased the committee of the Board of Education that negotiations have already been commenced for sites on which to carry three of them into execution. So far as we can judge from the plans and perspective view published in the New York *Herald*, the design, which, as we are informed, "is evolved from the Hôtel Cluny, in Paris," consists essentially in a plan of the letter-H shape, comprising two wings, each containing five school-rooms on each floor, with a cross-piece, which shows six rooms, nearly or quite large enough for school-rooms, but which is described as being devoted to play-rooms for rainy weather; the upper story of the cross-piece being utilized as an assembly-hall. The building is intended to be erected in the middle of a block, the side walls being blank, unless, as is shown in the perspective view, they have windows above the roofs of the adjoining buildings. It is hardly necessary to say that the letter-H type of plan has long been familiar to all architects who have had anything to do with school-house designing; and those architects who are inclined to lament that they should have missed the idea of modelling their school-houses after the Hôtel Cluny may derive some consolation from the fact that the published plans and perspective bear no discernible resemblance to that familiar building.

APART from such credit as may be claimed for it on this score, the new plan, which is said to be the work of Mr. Snyder, the Superintendent of School Buildings, exhibits the defects that would naturally be looked for in the work of an amateur, attempting to solve an extremely difficult problem. Undoubtedly, the letter-H arrangement, by which light is obtained from court-yards open on one side to the street, is a good one, as the court-yards give rather better light, and much better air, with less noise, than can be obtained from windows opening directly on streets; but the intersections of the cross-piece with the wings present difficult problems of lighting, which appear to be very inadequately met in the published plan. Instead of the arrangement which would occur most naturally to a school-architect, of having the cross-piece consist of one tier of school-rooms, with a corridor on the north side, and an open court, at least as large as a school-room, at

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each end, planning the short corridors for the wings so as to receive light at one end from this court, and at the other directly from the street, the plans show, we hope erroneously, the middle portion of the wings, where the courts ought to be, filled with a miscellaneous assortment of rooms and staircases, which would, apparently, be perfectly dark, while the corridors for the wings, extending from this lightless region, next the dead wall, just far enough to give access to the furthest school-room, and being there intercepted by closets, or other rooms, would also be perfectly dark. In a similar way, the rooms in the cross-piece, of which there are two rows, are served by a corridor in the middle, abutting at each end upon the dark space before mentioned. All this, we need hardly say, is thoroughly amateurish. No school architect, now-a-days, thinks of arranging rooms on each side of a corridor, unless the corridor is short, and brilliantly lighted at each end, or, if it exceeds a very moderate length, is lighted in the middle, by recesses of some sort, directly from the outer air. Of course, in the present case it will be said that the corridors will be sufficiently illuminated by fan-lights over the school-room doors, or by borrowed lights in the walls of the rooms; but even architects do not always realize that a square foot of borrowed light in the wall of a room thirty feet wide gives only one-fourth as much light as a square foot of glass in the wall of a room fifteen feet wide, so that standards of illumination derived from observations made in private houses and office-buildings, where the rooms are small, are very far from being applicable to school-houses; and, in point of fact, the gas burns all day in the corridors of many a school-house, of the type of twenty-five years ago, better supplied with light, so far as we can judge from the published drawings, than this model structure, which the Board of Education is in so much of a hurry to carry out. It is understood that we do not wish to detract from such merits as Mr. Snyder's plan may possess, still less to base a criticism of it on the coarse and hasty cuts of a daily paper, but it seems to be evident that the plan affords room for great improvement, and the best time to improve plans is before they are carried into execution.

ARCHITECTS, who think that it is for their advantage to enter indiscriminately into competitions for the benefit of public officials about whom they know nothing, will do well to read and ponder an article in the current *Atlantic Monthly*, giving the experience of some school-teachers with the persons in office, upon whose sense of honor the fortunes of the architects who have to do with them, even more than those of the school-teachers, absolutely depend. One of the teachers whose letters make up the article writes of his adventures with the magnates of a town which we may call B. The town had advertised for teachers for some of the public schools, announcing that "competitive examinations" would be held for candidates, and he entered himself as a candidate. An acquaintance of his, a military man, who was one of the town council, told him that he did not think there was much use in his trying the examination, as it was intended to reappoint the old teachers, and the examination was simply a form, gone through with to please a couple of new members of the city government, who had been making a fuss. The would-be teacher, on considering again the terms of the invitation, concluded to try the examination, whether it was a "mere form" or not; and he, with the other candidates, including the old teachers, whom the ruling clique intended to reappoint, appeared on the appointed day, and wrote answers to an interminable series of questions. So far as visible indications were concerned, all the candidates worked on equal terms, and it was not until some time later that he discovered that the old teachers had been supplied by their protectors with copies of the questions a week or more before the date of the examination, so that they might fortify themselves for the trial. Notwithstanding the advantage thus given to his rivals, the newcomer passed the examination with such superior credit that he was declared entitled to the position that he desired, and was installed accordingly, and taught for a year or two unmolested. Then an order was suddenly passed by the City Council, reducing the salaries of all the teachers in his grade. His military friend, whom he happened to meet a little later, explained that one of the teachers of that grade came to his store to look at a baby-carriage, and then went and bought one somewhere else, and he had taken that method of "getting even" with him. A year later, some other town magnate seemed to have occasion for "getting even" with a teacher, for another reduction of salaries was made, accompanied this time with an assessment to help pay the expense of reëlecting these noble citizens to their high office. This was the last experience of the *Atlantic Monthly* correspondent in that town, for he declined to pay his assessment, and anticipated his summary discharge by resigning his place.

IT is, in the great majority of cases, to people with such ideas of administering the public trusts committed to them that architects who compete in good faith for court-houses, jails, town-halls and schools confide their interests. If the *Atlantic* should see fit, in aid of the cause of decent municipal government in this country, to continue its expositions of the loathsome meanness and dishonesty of town officials, the architects could furnish an interesting chapter, and, if we are not mistaken, the engineers could supply another. Of course, there are in this country town officers whose honorable conduct deserves the highest respect and praise, but they do not commonly form a majority of the town government, and, even if they do, an active and tricky minority can generally find opportunity for exercising its peculiar talents at the expense of people who are so incautious as to deal with the town without an explicit and satisfactory contract.

THE State of Minnesota, soon after the dreadful forest fire of 1894, in which four hundred and eighteen persons perished, passed a law for the Preservation of Forests, in which it was provided that a Chief Fire Warden should be appointed, whose duty it should be to take measures for the protection of the forests of the State, with the help of resident Fire Wardens in the forest and prairie districts, by the investigation of the causes of fires in forest lands, and the punishment of incendiarism and carelessness. This law has been in operation a year, and the Chief Fire Warden, Mr. C. C. Andrews, has just presented his first annual report. This document gives a great deal of valuable information in regard to the causes of the conflagrations which are destroying so much of the most valuable property in the United States, and, incidentally, affords suggestions in regard to the management of woodland which are of considerable importance. It is already known, in general, that locomotive engines set most of the very destructive fires, but exact statistics of the damage clearly traceable to this and to other causes have not been available. Now, through Mr. Andrews's figures, we find that, in Minnesota, during the past year, thirty-nine prairie-fires were set by sparks from locomotives, burning over twenty thousand acres of land. The next in importance of the causes of fires seems to have been the practice, common in the grain fields, of burning the straw and stubble. This dangerous work set fires which overran twenty-eight thousand acres of land, causing damage nearly equal to that due to the locomotive sparks. Threshing-engines caused twelve fires, and thirteen were due to causes unknown. Of the forest-fires, which were, last year, of less importance than those on the prairies, although more than eight thousand acres were burned over, four were caused by locomotive sparks, seven by careless hunters and fishermen, or tramps, and nine were due to causes unknown.

THE letters sent by the fire wardens and others, throughout Minnesota to their Chief, in reply to his circular of inquiries, are remarkably intelligent and interesting. They show plainly enough the imperative necessity for providing locomotives with spark-arresters, and for vigorously punishing carelessness in lighting camp-fires, and in burning straw and stubble without ploughing around the heap a margin wide enough to make sure that no sparks can cross it. It is curious that the Indians, of whom, it must be remembered, there are still about seven thousand in Minnesota, are much more careful than the whites in extinguishing their camp-fires before leaving them, and several of the fire wardens express the opinion that white hunters ought to be obliged to use the same precaution. The new law, very wisely, provides that any person who carelessly sets fire to forest or prairie land, even land belonging to himself, by the spread of which damage is done to the property of others, shall be punished by fine or imprisonment; and if life is sacrificed in consequence of his carelessness, the term of imprisonment may be extended to ten years, with a fine in addition. It seems that some of the farmers grumble at this feature of the law, but there can be no doubt, not only that it is just and right, but that it will serve, better than all other means put together, to prevent fires due to carelessness.

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HISTORY OF THE UNITED STATES CAPITOL.[1]—IV.

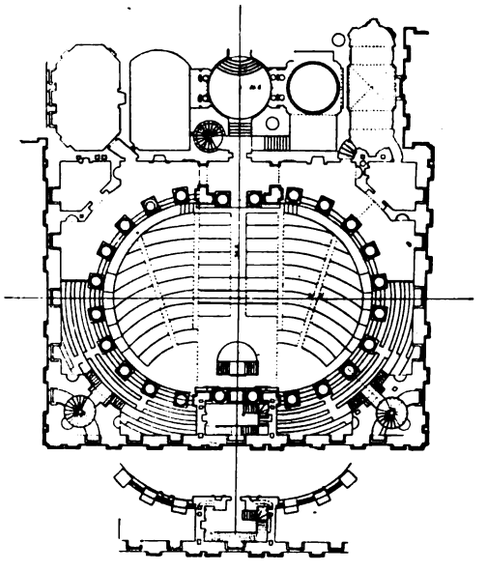


Fig. 23. Latrobe's Modification of Old House Plan.

THE following letters from Thomas Jefferson give the particulars of Benj. H. Latrobe's appointment as "Director of Public Works" or "Surveyor of Public Buildings," the position formerly held by James Hoban.

WASHINGTON, D. C., March 6, 1803.

Sir, — Congress has appropriated a sum of $50,000 to be applied to the Public Buildings under my direction. This falls, of course, under the immediate business of the Superintendent, Mr. Munroe, whose office is substituted for that of the Board of Commissioners. The former post of Surveyor of the Public Buildings, which Mr. Hoban held until the dissolution of the Board [at $1,700 a year] will be revived.

If you choose to accept it you will be appointed to it and would be expected to come on by the first of April; indeed, if you could make a flying trip here to set contractors at work immediately, in raising freestone, it would be extremely important, because it is now late to have to engage laborers and the quantity of freestone which can be raised, delivered and cut in the season is the only thing that will limit the extent of our operations this year.

I set out to-morrow for Monticello and shall be absent three weeks, but shall be glad to receive there your answer to this.

Accept my friendly salutations and regards. TH. JEFFERSON.

P. S. — On the raising of freestone be pleased to consult Col. D. H. Brent, who can give you better information and advice on the subject than any other person whatever, having been much concerned in the business himself.

March 6, 1803.

Dear Sir, — The letter in which this is enclosed being a public one and to be produced whenever necessary as a voucher, I have thought that it would be useful to add a word in one of a private and friendly nature. From the sum of $50,000 we shall take between $5,000 and $10,000 for covering the north wing of the Capitol and the President's House.

The residue of $40,000 to $45,000 will be employed in building the south wing, as far as it will go. I think it will raise the external walls as far as the uppermost window sills, being those of the entresols, and I have no doubt Congress at their next session will give another $50,000, which will complete that wing inside and out in the year 1804. . . . Should you think proper to undertake it if you come on here on a flying trip as suggested in my other letter, you can advise with Mr. Munroe, who will set into motion whatever you may desire; and if you can be here finally the first week in April you will find me here and everything may be put under full sail for the season.

Accept my best wishes and respects. TH. JEFFERSON.

P. S. — I think a great deal of sheet-iron will be wanting.

Latrobe accepted this appointment and took charge of the work immediately.

April 7, 1803, he appointed John Lenthall, Clerk-of-works, giving him the following authority:

"I have to inform you that it is clearly understood by the President of the United States and the Superintendent of the city, that you are to be the sole judge of the merits of the workmen. . . . You are also the sole judge in my absence of the fidelity with which contracts are fulfilled . . . no money will be paid without your certificate, you will thereby obtain complete control over the conduct of every man employed."

Although Latrobe was appointed to superintend the completion of the Capitol according to Thornton's designs, his first thought upon taking the work seems to have been upon changes he could suggest, and after the experience with Hallet and Hadfield this naturally provoked Thornton.

Latrobe after eight or nine months' study made his suggestions to Jefferson, who referred him to Thornton. Latrobe's letter [February 27, 1804] to Jefferson gives the result of the interview.

"*Dear Sir*, — I judged very ill in going to Dr. Thornton. In a few peremptory words he, in fact, told me that no difficulties existed in his plan but such as were made by those who were too ignorant to remove them; and though those were not exactly his words, his expressions, his tones, his manners and his absolute refusal to discuss the subject, spoke his meaning more strongly and offensively than I have expressed."

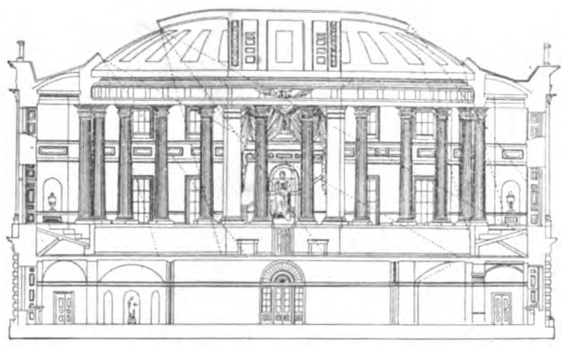


Fig. 24. Latrobe's Modification of Old House: Longitudinal Section.

President Jefferson replied on the following day.

"*Dear Sir*, — I am very sorry the explanations attempted between Dr. Thornton and yourself on the manner of finishing the House of Representatives have not succeeded."

Latrobe carried on his crusade against Thornton's design and plans vigorously and persistently until he partially accomplished his purpose. To his own mind, as well as to that of others in authority, he justified his changes of the accepted plan.

In efforts to accomplish his purpose, Latrobe had personal interviews with the President, and used his early reports to Congress with effect. His Reports, a letter to Jefferson, March 29, 1804, and a pamphlet of thirty-two pages, entitled "A Private Letter to Individual Members of Congress on the Subject of the Public Buildings of the United States" [November 28, 1806] are on record.

In his criticisms Latrobe was sharp, sarcastic, unreasonable and unjust, judging from the records, letters, drawings and pamphlets. It is entirely natural Dr. Thornton should have been dissatisfied, and from the nature and ability of the man that he should return criticism of equal sharpness.

Latrobe's letter to the President and Reports state that the open space enclosed by the elliptical hall becomes a dark cellar when the Legislative Hall is raised to the story above. "Therefore, the doors leading into it are useless if not absurd." "No fireplaces can be carried up except on outer walls and this would be difficult on account of hardness of brickwork. No staircases could be built behind the Speaker's chair in elliptical enclosure."

Latrobe proposed to rectify these errors, according to his ideas, by changing the elliptical form of the chamber, and substituting "two semicircles abutting on a parallelogram." He further took the liberty to alter the whole of Thornton's plan where "a spacious stairway ran *only to a gallery* and a room fifty feet square with one window" (Fig. 23.). If Latrobe could see the present requirements of a gallery he would see that a spacious stairway was necessary!

Latrobe seriously objected both in his letters and printed documents to the design with which he *was compelled* to conform, because of the portions of the building already erected.

To defend himself and his design before Congress and the people, Thornton addressed a letter to Congress in answer to Latrobe's report. The document is a very clear statement of the case, and all the facts as stated are confirmed by the records or contemporary documents. For this reason I quote liberally from this letter of

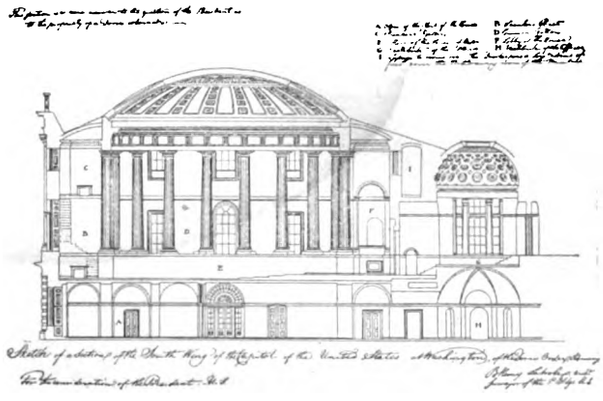


Fig. 25. Latrobe's Modification of Old House: Cross Section.

January 1, 1805. He says "Previous to Mr. Latrobe's appointment when he came to report on dry-docks suggested by the President, he often complimented me on the plan of the Capitol, a ground-plan and elevation of which I had shown him, and he declared in the presence of the Superintendent [probably James Hoban at that time], that he never saw any other plan of a building

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besides his own that he would deign to execute. I must own I cannot easily conceive why previous to this appointment I should hear nothing but approbation of my plan and after his appointment nothing but condemnation.

"In the commencement of his report he mentions the approval of my plan by Gen. Washington. . . ."

"Mr. Hallet was appointed to execute it, but not until after I had

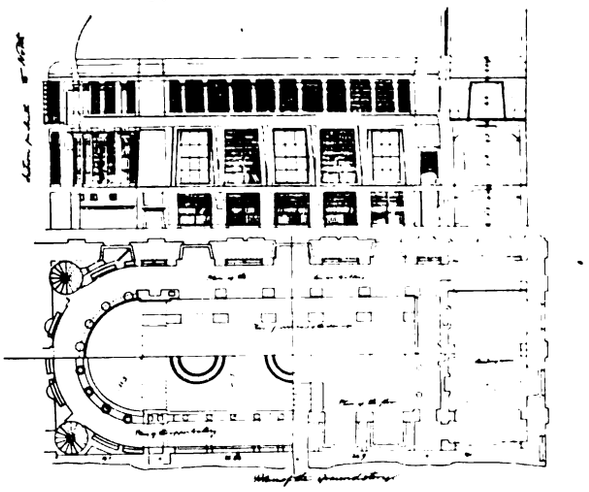


Fig. 26. Library Opposite Senate, North Wing.

refused to superintend its execution, ... Mr. Hallet was desirous of altering not merely what might be improved, but even what was most approved." At this point he describes Hallet's attempted changes, an account of which I have given in previous pages. After describing the removal of the foundations laid by Hallet for his square central space instead of a dome, Thornton continues: "A portion of what I intended to remove was directed by the Board of Commissioners to remain in order to erect thereon a temporary building of brick for the accommodation of Congress until more committee-rooms could be prepared by the further progress of the building. On the opposite side, the walls built by Mr. Hallet between the dome and the Representatives Chamber still remain, which may in some way account for the difference mentioned by Mr. Latrobe between the plan as laid down and the drawing. Mr. Hallet was not in the public service when I was appointed Commissioner, September 12, 1794." Then he describes Hadfield's connection with the Capitol, an account of which I have already given. After the statement of facts, in reference to his design, which I have found fully proved by the public records, he continues: "Mr. Latrobe must have been exceedingly misinformed, when he speaks of the various styles of each architect showing themselves in the work, one having been out of public employ before the present elevation was drawn, and before a single freestone was laid, and the other having taken his discharge because he was not allowed to make any material alterations.

"They are both [Hallet and Hadfield], however, men of genius which I acknowledge with pleasure.

"Mr. Latrobe's observation respecting the want of agreement in the plan and foundation is already answered; but if I could be surprised at any observation made by Mr. Latrobe after reading his Report, it would be at his stating the author furnished him only a ground-plan. It may be true I did not give him drawings, but I informed him what was intended in completing the south wing, and to show that he understood we need only his description — 10th page of the Committee's Report." It must be remembered that it was only the south wing that was under discussion and the exterior

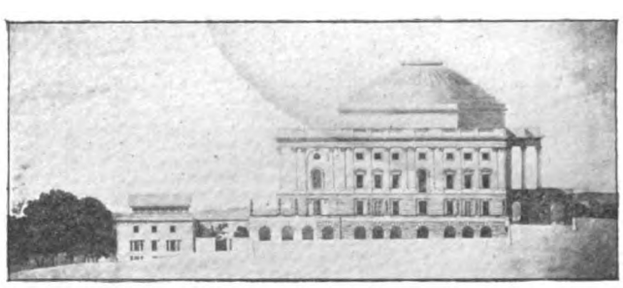


Fig. 27. South Elevation: Drawing by Latrobe, 1811.

of the south wing was to be an exact duplicate of the north wing, which was completed when Latrobe took charge, and further, that the drawings had never been in Thornton's possession since the commencement of the work.

"He [Latrobe] speaks of the impracticability of the plan of the south wing. It has been deemed practicable by very skilful and practical architects and I never heard it disputed by other than himself. He told me that he could not execute it as it was intended

To support a coved ceiling formed in the manner of the Hal au Blé at Paris of the extent contemplated on columns of wood [It will be remembered that Thornton's original idea was to make the interior work of marble] cannot in the conception of an architect be difficult; and I believe it will be generally admitted that the grandeur of the room contemplated would far exceed the appearance of the one intended by him and at much less expense. The stability of the work could not be an objection, when it is remembered how many hundred years Westminster Hall has stood.

"It is astonishing what evidence is considered sufficient to establish facts to a mind that I am sorry to say appears preoccupied by a desire to condemn. [Dr. Thornton here quotes from Latrobe.] 'The most indisputable evidence was brought before me to prove'

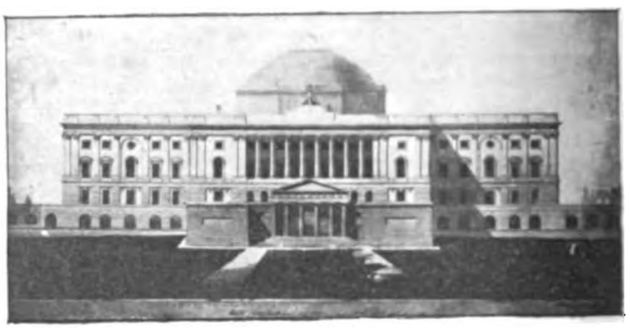


Fig. 28. West Elevation: Drawing by Latrobe, 1811.

[a negation] that no sections or detail drawings of the building had ever existed excepting those that were made from time to time by Messrs. Hallet and Hadfield for their own use in the direction of the work.' Page 10.

"It will be remembered that one of these gentlemen never superintended the laying of a single stone of the elevation. The other did not make a single section that I ever heard of; but required sections of me, which I drew and of which Mr. Munroe told me he had informed Mr. Latrobe.

"The whole area of the south wing of the Capitol might be conceived by some as too extensive for a Chamber of Representatives, but if we consider the rapid increase of the American people, and that five hundred Representatives may be required, neither the space allotted for the members nor the gallery for the audience will be considered too large. To lessen either would, therefore, in my judgment be a very important objection.

"Mr. Latrobe mentions the want of committee and other rooms. The President [Mr. Jefferson] of the United States had some months before Mr. Latrobe's appointment, spoken to me on the subject, and asked if they could be formed in the basement story with convenience, under the Representatives Chamber.

"Approving much the idea on many accounts, independent of its restoring the building to a greater conformity with my original designs for the south wing raised, with committee-rooms under the galleries.

"The President's idea was carried farther, for I drew a plan of the Senate-room [present Supreme Court] raised, within a few feet of the base of the columns and with two good rooms beneath, one on

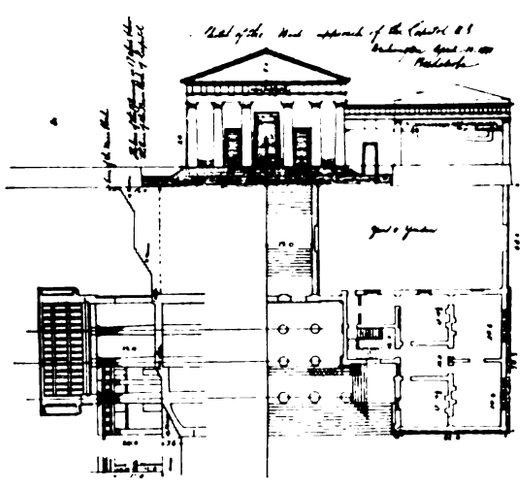


Fig. 28*a*. Sketch of West Approach of the Capitol by Latrobe, 1811.

each side, besides two smaller for paper, etc., and a passage from a door in the external center to the lobby. This would much improve the proportion of the Senate-room, the arcade of which is too high for the columns.

"A coved ceiling might be thrown from the entablature so as to give any desired elevation.

"These alterations were laid before the President [Jefferson] many months before Mr. Latrobe's report was written, and if Mr.

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Latrobe had extended his alterations only to the committee and other rooms, however they might have differed from mine in form, size, or appropriateness, I should not have considered them of sufficient importance to call forth my objections; but under a sincere conviction that the Representatives Chamber will be irreparably [marred] by the alterations now in execution, I am compelled by a sense of duty, but with great reluctance on other accounts, to express my disapprobation of the measure.

"I have seen Mr. Latrobe's report of December last and find much stress is laid on the imperfections of the foundation of the south wing, which required to be taken down.

"Six feet [in height] of the foundation had been built by a contractor, during whose absence the work was ill-conducted by those in whom he had confided. The work was directed to be examined and was condemned by the Commissioners.

"The correspondent part of the north wing was taken down and good bond stones intermingled throughout the new work, by which it was rendered completely solid; and as that and the stonework of the elevation were well executed, if any defect can be hereafter discovered it must depend upon injuries received by piercing so many large holes through it, or on defects in the lower part of the foundation which was laid before I was in office.

"It was a query at the time of its execution whether it would not be better to lay the foundation with inverted arches, but it was thought more expensive and not better than by good bond stones in the more usual manner, and I imagine that those who pierced the foundations of the north wing, thereby injuring it by cutting loose many of the bonds, found it to be exceptional work; but I think it might have been perfectly aired by tubes at a trifling expense without risking any injury whatever.

"The roof has been justly condemned.

"It is next to impossible to put any elevated covering that shall resist the ingress of water when the gutters are filled with snow or deluged with rain. I object to the roof as now executed not solely on that account. By rising so high, the balustrade is darkened until

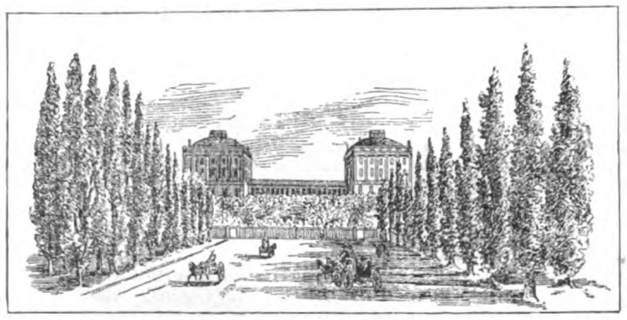


Fig 29. The Capitol, 1811-14, from Pennsylvania Ave.

the beholder advances so near the building as to lose the general view; it is thus rendered heavy in appearance. I proposed a flat roof made with a composition that has since been found to answer perfectly by Mr. Foxall, and by varying the ingredients a little he has formed a variety of excellent cements. It is made in imitation of a terraced roof, though greatly superior." [1]

This was the last public effort of Thornton in defence of his plan. The alterations advised by Latrobe were adopted, and I think few will contend that they were improvements. [See Figs. 23 to 29.]

Although Dr. Thornton made no further efforts to preserve the integrity of his plan, Latrobe still found he did not have an easy time contending with Jefferson, Congress and the newspapers. Jefferson had individual ideas on architecture, Congress considered the cost, and were slow in making and gave but little in their appropriations, at the same time they were disposed to take exception to the time of erection and cost of construction. The newspapers complained of the slow progress, character of the work and of Latrobe's frequent absence from the city in connection with his private business. Thornton likewise prodded him on his deficiences in private and published letters.

As a general answer to these parties, Latrobe, on November 28, 1806, issued a pamphlet, entitled "A Private Letter to the Individual Members of Congress on the Subject of the Public Buildings of the United States."

In this letter he gives as his excuse for the slow progress of the work the uncertainty of Government appropriations, and the difficulties of quarrying stone. He makes a plea for changing the method of making appropriations. From this he passes into criticisms of Thornton's design, and states that the method of choosing a design by competition was a mistake and certain of defeating its own end. He refers to the design of the north wing which he was compelled to follow in the south wing [The present Supreme Court and Statuary Hall]. "I frankly confess that, excepting a few of the details, all my ideas of good taste and even good sense in architecture were shocked by the style of the building. *I am well aware that in what I shall say in this I am in the minority. All books for the last three or four hundred years are against me. But as the arts continue to improve, simplicity gains more admirers daily. . . .*

"But with the actual shape and appearance of the building little could be done but adhere to the style of the exterior and to add all the conveniences of the offices which were required for the transaction of the business of the House."

At this point Latrobe describes quite minutely the changes which he claimed to have made in the original plan. As these points are treated fully in other portions of this treatise I will not quote them here.

He compliments Jefferson in the following glowing terms:

"The warm interest which the President has taken in everything that relates to the design, arrangement and management of the work, and to that impulse which a mind by whom no field of art or science has been unexplored gives to all the agents he employs, more is due than delicacy permits me to express."

"On the intelligent activity and integrity of the Clerk-of-works, Mr. Lenthall, it is impossible to bestow too much commendation."

Thornton published a sharp and sarcastic answer to this pamphlet which is interesting in its local hits and comments, but as it simply covers facts which have been mentioned before I will not quote from it.

From this period until the work ceased on the Capitol in 1811, Latrobe appears to have been untrammelled except by the restrictions of President Jefferson.

Munroe, who assumed a part of the duties belonging to the Board of Commissioners, either did not keep a record of the work, or such record has been lost; neither are the letters in reference to the subject in possession of the Government.

The data from which information must be drawn are letters of Latrobe in the possession of the family; a volume from Latrobe to John Lenthall, Clerk-of-works, in possession of Mr. W. S. Abert, a grandson of Lenthall; Latrobe's Report to Congress and Jefferson's published correspondence.

Unfortunately, this matter covers only one side of the issue. In reference to all points before this date we have the regularly recorded transactions of the Commissioners and letters covering both sides of every question.

To arrive at a clear understanding of B. H. Latrobe's work on the Capitol it is necessary to compare his drawings with Thornton's, and his letters and reports with documents of earlier date showing what had been contemplated before he took charge.

I have already mentioned the changes which Latrobe proposed in connection with the south wing [present Statuary Hall] (Fig. 23). These changes were carried out and Latrobe took great credit for the alteration of a very gracefully formed elliptical room into a badly formed one with two short sides and semicircular ends, decreasing the size and changing the form of the staircase to the galleries and placing committee-rooms under galleries. Thornton had previously made a plan for this purpose (See Fig. 19). It will be seen at a glance, by comparing the plan of Thornton with the one of Latrobe, that the changes were simply modifications in form, size and detail. Thornton's original scheme still remained, so changed as to destroy much of its beauty and utility, but the broad principles of his plan for this portion of the building were still intact.

The Hall of Representatives was considered upon its completion, a very magnificent room. The British officer who burned it said it was a "pity to burn anything so beautiful," and Mr. Jefferson in a letter from Monticello, April 14, 1811, says, "I declare, on many and all occasions, that I considered you [B. H. Latrobe] the only person in the United States who could have *executed* the Representative Chamber or who could *execute* the middle building on any of the plans proposed," and, July, 1812, "The Representative Chamber will remain a durable monument to your talents as an architect."

It is easy for an architect to take the suggestion of Thornton's plan and imagine or realize how much more effective a hall reared on its lines would have been than the one built on the lines shown by Latrobe's plan.

Jefferson's instructions or interference in the plan and design of the Capitol appears to have been, judging from his letters, usually suggestive and not mandatory. These recommendations usually appear to have been in reference to detail; his idea, as we learn from hints all the way through the correspondence, was to follow Thornton's plan, with which he was familiar from its first appearance in the competition.

Latrobe says in the pamphlet above referred to [1806]: "That he [Jefferson] directed I should deviate as little as possible from the plan approved by General Washington."

GLENN BROWN.

[To be continued.]

[1] This form of roof, which appears to have been the prototype of the mastic and cement roofs so common at the present day on fireproof buildings, was expected to get better with age. It was put on Mr. Foxall's residence in Georgetown and on the public stores in Navy Yard in 1805.

AN ALLEGED PROTOTYPE OF THE VENUS DE MILO. — Since Melos first yielded up its priceless treasure of the world-famed Venus de Milo, now in the museum of the Louvre at Paris, it has been the dream and despair of sculptors of every nation on the face of the globe to restore the arms that are wanting to the statue. It would appear that the problem created by the absence of these two arms is about to be set at rest through the discovery by the eminent French archæologist, Santorin, during the course of his excavations in Greece, of an antique statue, which, though wanting the head, is declared to be in other respects an exact replica of the Venus de Milo plus the arms. — *N. Y. Times.*

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OLD LOMBARD AND VENETIAN VILLAS.[1] — I.

THE first Southern impression, after rushing down the precipitous terraces, dropping down the terrific ledge which separates the high Alpine plateau from the Val Bregaglia — the first impression of this sudden drop from winter into summer is that of the old Salis house at Soglio. Nay, rather the first strong impression after that of the previous evening, when in the gathering darkness we walked down from the Roseg glacier, and drove in the dark down its narrow valley, the carriage lights waking dim visions of huge boulders and of larch trunks and branches hanging among the invisible things; and, overhead, the milky way fitting into the narrow slit between the high black walls, and reaching with its pale, tremulous light to the dim luminousness of the glacier, which carried on the light of the sky to the dark earth at the end of the valley.

Only twenty-four hours, and perhaps as many miles, separated us from that primeval, unhuman solitude of sky and mountain — sky and mountain but so lately muffled in snowstorms. It was impossible to realize it as we went up the hill of Soglio through the chestnut woods, high above the torrent's roar, and entered the curious old house at the top. Perhaps, indeed, it was the absence of human element on that roof of the world whence we had descended which made the perfume of past things hanging about this house so strong and poignant; a perfume of the past, but of passed life. A rambling seventeenth-century house, now an inn, to the back of a hamlet of log huts and black stone cottages — a sort of villa, doubtless sprung up on the site of a castle, and retaining still its entire furniture — painted and gilded beds, beneath whose escutcheons generations have been born and have died, great carved and inlaid chests of drawers, and blackened pictures, all graceful with the curves of the late seventeenth and early eighteenth century: one room still perfect with sea-green brocade and curtains and great green stove; others stuccoed, and others panelled with the reddish wood of the great mountain pine. The warm, resinous, cedar-like smell of this panelling, the scent of sun-dried, fading flowers from the garden behind, the vague exhalations of the old silk and leather, went to one's head after that woodland unbreathed air of the Engadine. The house was redolent with the charm of human habitation. But — strange contrast! — passing out of these panelled, brocaded rooms, through the little *Estrich*, or guard-chamber, still hung with banners, rusty fowling-pieces, steel gloves, and even a coat-of-mail — passing, and looking up out of that little garden with its clipped hedges and sun-dried flowers, you suddenly find yourself again in the presence of the great mountains. The valley below is gone, save for the sough of its torrent; and opposite, close in front, looking down on one, is a vast mountain side, gashed with glacier, a huge crown of crystal-shaped peaks and crags, like obelisks and inverted icicles, such as Leonardo painted behind the mysterious cobalt grottos of the Virgin of the Rocks. But looking southwards, a valley of blue mists and sunbeams, turning into Alps where they meet the sky.

What a strange life, that of these mountain potentates, half graziers, half mercenary captains, bringing from the looted plain its luxuries and fashions to be stared at by the glaciers!

Cernobbio, Lake of Como. — The day before leaving the Engadine, I met in the village two Italian women in the blue dress of Valtellina, selling brooms made of sorghum, and carrying on their backs wicker hods whose contents were covered by bay twigs. Those bay twigs, in a way, sum up one's impressions of return to Italy. They mean, even met in that valley of larches, the gardens of Rome and of Florence, the past, the classic poetry, as in that Venetian portrait of Ariosto, Italy; and beyond it a vague far-off trail of islands and promontories and triumphant names, which is Greece.

This is the symbol of what the South gives to the mind. At Cadenabbia, where we landed on our way to the plains, there came, with the whiffs of *olea fragrans*, the sense of the South's mere delightfulness as such — the South which melted the barbarians like wax. We walked for a little in the Sommariva Gardens, under the trellised lemons and limes, and we sat for a while on the parapet of the lake, under the villa terraces, where, beneath the big plane trees, fruit is stacked for sale, and silk wares and foolish bits of brocade are pinned against the trunks, the scent of the *olea fragrans* coming in whiffs, like snatches of over-luscious melody. The sun was setting, and the water, of pale, shiny green, was beginning to be shot, then mottled, with pale-rose color, as if the petals of the belated, over-blown roses of the lake villas were being strewn upon it. Opposite, already preternaturally white, glimmered the houses and belfries of Bellagio.

It was dark when we returned to the boat and continued our journey. An irregular roof of stars hung over the black water and black hills; the hills with only an isolated spot of light telling of a village. The water was streaked in two places by the long, rippled reflection of Mars and of Venus. It seemed quite natural to be there, and quite unaccountable how we had got there.

Cernobbio, Sept. 20. — Donna V——, in her little pink eighteenth-century casino, built on piles in the lake, tells us some anecdotes which make one feel that here, in the Milanese, the Napoleonic times are still near at hand. Her great-aunt, wife of one of Napoleon's generals, could find no better way of celebrating his return from the Peninsular War than by a triumphal entry into her villa garden, where she had erected sham towers and walls, to remind him and coming ages of his sieges and victories.

This end of the lake, where, walking up the valley or over the hills, one is in Switzerland, is the natural home of conspirators; the place of the journey of Fabrice del Dongo (in Stendhal's immortal romance) to join Napoleon in 1815, Fabrice, aged seventeen, with his mother's diamonds sewn in his coat linings, and in his pocket the passport describing him as "Vasi, *marchand de baromètres portant sa marchandise*." The same adventures were repeated in 1859, when my friend Luigi E——, seventeen, like Stendhal's hero, escaped from college at Pavia to join the Sardinian army, and was conveyed across these mountains by mysterious agents, one of many lads but just in time to have a brand-new uniform stained with blood and soaked with rain in the long summer hurricane of Solferino. They had at that time, he says, a regular system for smuggling men across these mountains, as they now have for less risky wares. Now, alas! of these smuggling feats there remains, of an eccentric sort, only one — the pouring of petroleum down channels on the Swiss hills and catching it on the Italian lake, where the drains of Donna V——'s garden are sometimes full of it. To what base uses has illicit ingenuity fallen!

Monza, Casa E., September 21. — In an atmosphere of awe, and of stale incense and unused vestments, a priest in full canonicals opened a reliquary after an appropriate prayer, and handed for our inspection that famous iron crown made of a nail of the True Cross, and which Napoleon had snatched, to the distress of well-bred Europe.

The crown, in which the twisted nail is merely inserted, has a fine barbaric air, fit for the Gunther or Dietrich of the "*Nibelungenlied*." But the treasury of Monza contains a number of even more curious and magnificent relics — ivory writing tablets carved with muses and poets, still keeping an Attic grace; great roughly-beaten gold crosses and crowns, studded with barbarous gems, jacinths and carbuncles and root of emerald and beryls, round-like beads for a Christmas-tree, but arranged on patterns of the Ravenna mosaics, patterns handed down from ornaments such as we find in archaic tombs. Also the gold cover of a Gospel, in which, among such bird's-egg jewels are set charming pagan intaglios and cameos of gods and goddesses; strange relics, all of them, of that crepuscular time when the heroes of the Volsunga-Saga (there are legends of Longobard kings which make one think of Sigurd) were trying to drape themselves in the tattered togas and stiff embroideries of old Rome and Byzantium.

But more poetical in their way, a collection of little straw baskets, like those for fish or fruit, in which the Lombard Crusaders had brought back relics from the Holy Land: little coarse, common, prosaic things set in great silver frames, among the silver busts of saints, the candlesticks, the jewelled crowns and croziers of the treasury; and which had been carried by wearied half-starved men, across how many hundreds of miles, through what sickness and danger — handed on, no doubt very often, by the dying soldier to his comrade, so that the beloved little town, far off in Lombardy, might have its share of blessed relics, like the rest.

Monza, September 24. — Driving about the hilly district called Brianza, between Como and Lecco, seeing country houses. An unreal impression of receiving hospitality from kind people whose names one barely knows, talking to uncles and cousins and sisters-in-law one knows not clearly of whom; and a curious, *piquant* contrast between beautiful old Italian villas, stuccoed and cypressed, and a quasi-English mode of life, with English tea-tables and English couches, and delightful Southern babies dressed in Greenaway frocks and dancing to the last English music-hall songs.

But all is *not* English, and tidy and beautifully restored and kept up in Lombardy. Witness the never-to-be-forgotten villa of the T——s at Paderno. This one is in the plain towards Milan. You drive for miles through ruts and dust, between dull-green acacia hedges; road after road, flat, dreary, through occasional squalid villages of stunted children, where flocks of mangy gray geese waddle round stagnant ponds; a country, you would say, where Pellagra, fearful daughter of neglect and maize diet, rules supreme; monotonous, melancholy, which the sunset itself can scarcely waken to interest and beauty. Here, among the endless fields of stunted mulberry trees and dry-stripped, gaunt maize, over which the sky-line bends in breathless lilac vapors, you come upon a walled and belfried village, if anything a degree more squalid than the others. Over its gateways stands the famous motto of the T—— of the Lake, as they call them; and the same coronetted motto creaks as a wrought-iron sign over a miserable inn-yard. In the midst, in a great scorched bare grass place, stands a huge palace, pillared and porticoed, and surrounded by rockeries. At the foot of its splendid steps the peasants were threshing and winnowing the maize, in a cloud and a shower of gold against the blue sky. A broken old peasant-woman emerged with heavy keys, conducting us into the vast *Court of Honor*, where the Roman Emperors on brackets once looked down on coaches and outriders and pages and bravos, but now upon grass-grown, echoing emptiness. Then through an endless series of immense saloons, shuttered and smelling of cellar and charnel house, an incredible smell of wine, decay and death. And as the caretaker threw open window after window, it was only to reveal the better the emptiness of these stuccoed and frescoed walls; emptiness the greater for an occasional statue, or stack of chairs, or huge worm-eaten billiard-table. In what was once the splendid library, and where hundreds of volumes still rotted behind gratings, there were collected all sorts of incongruous pieces of furniture: two mouldering spinning-wheels, some tables for long-forgotten games, billiard cues, and in a corner a pole with a knob at the top for dressing wigs upon.

[1] An article by Vernon Lee in *Cosmopolis*.

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All this was strange enough; still, what can you expect from a house deserted for a century and more? But when we had ascended to the first floor, it was borne in upon us, very slowly indeed, that the house was not abandoned, nay, was actually prepared to receive its masters in a few days! Be this as it might (and the suspicion arose very slowly in one's mind), the throwing open of shutters in one vast, vaulted, frescoed room after another, the unlocking of the worm-eaten doors with half-effaced gilded and arabesqued panels, this incongruous admission of daylight, revealed a suite of apartments perfectly furnished; walls closely hung with pictures, rooms stately with beautiful chairs, tables and brocade-draped beds. But the pictures were black, cracked, peeling off, the gold of the frames black also; the card, writing and toilet tables of charming carved Louis-XIV shapes, were gray and rough where the polish had once been, and the beds were plumed erections like state-hearses! Oh, the funereal magnificence of those beds, with their tent-like sweep, their five vase-shaped plumes (I found a lot of such also stocked in a lumber-room) of velvet and gold, and their long curtains of crimson brocade or green-flowered damask! Things in which a live man or woman would be like a corpse, and the black ancestors and kings and queens on the walls, the ghosts of that house, would be the real, living inhabitants: a Velasquez-looking lady particularly, in pale-blue satin farthingale, fixing you with black Spanish eyes, and her black and bilious wide-breeched cavalier. Oh those beds, those solemn, funereal, ghostly, pompous beds! "And this one," said the housekeeper, swishing the dust with her apron, and pointing to a great orange silk monument like a sacrificial pyre, "*this is the one prepared for the little bride!*" A little bride in that bed!

It was, once the fact had penetrated to one's mind, more terrible to think that the little duchesses, the tiny granddaughters, were to sleep under a similar canopy, in a perfect gallery of Spanish grandees, with Philip IV, after Velasquez, stalking, blond, blear, in slashed black doublet and white stockings, at their head. Next to the bedroom of the little duchesses, hung, in a saloon, a curious family portrait — a nun, engaged in conversation with a little girl, already in the brown-and-white nun's dress, but with her blond hair still in waves, and tied with a rose-knot, like the Infanta Margaret. Some future *Monaca di Monza*, like the one whose mysterious history Manzoni has told, but told less strangely and horribly than the real documents I was reading this morning; some princely baby-girl, brought up with dolls dressed as priests and nuns, to await, with her womanhood, Christ, death, or some sacrilegious lover like Paolo Osio, and everywhere the smell of damp and corruption. From the palace we descend into the garden. Weeds, pumpkins, tomatoes and some tawdry draggled zinneas and dahlias grew about the house, and in front, stretched into the lilacy-blue distance, a long, long bowling-green of high, coarse grass, closed-in by hedges of unshorn hornbeam.

"What can the people be made of, to live in such a place!" I exclaimed, and scattered a few adjectives at the owners of this ghastly splendor.

"Not at all," answered my hostess; "they are very worthy people. This place has fallen to their share with other ones, and not a *soldo* of capital. No one will rent it, of course, and the taxes are assessed at its value if inhabited. So, as there is no possibility of repairing anything, they just come and pass a month in it as it is, so as not to abandon it utterly. They feel their duties to the place, and give at least their presence. It can't be cheerful, you know, a month at Paderno. I think it's rather grand of them."

"It is grand, and worthy of the house," I answered, looking back at the endless rows of shuttered windows, the weather-cocks and broken roof obelisks above the stunted mulberry trees and the parched Indian corn of the plain.

Bergamo, Palazzo S——, Città Bassa, September 26. — The chief interest of this charming town, piled in two heaps on its hillside, with vineyards and pastures between, is certainly Lotto. He painted busily during a long lifetime (1480 to 1556), and pictures by him exist in most great galleries, but one must come to Bergamo to understand his great and singular personality. Although a Venetian in the essential painting quality, and in a certain voluptuous solemnity, Lorenzo Lotto stands out quite separate from the two great exchangeable earlier Venetians, Giorgione and Titian, and their retinue — big and small — of Palma, Bordone, Bonifazio, Catena, Cariani, and so forth. Separate, different, shining out in virtue of a brighter color, a more lively composition, more vehement and momentary gesture, a more pathetic, episodic fancy, as of Tasso's poignant romance compared with the idyllic heroism of Spenser — the restless, inventive romance as compared with the lyric, steeped in sentiment and suggestion; and he leaves in the mind, with his brilliancy and sort of diagonal vivacity, a sense of discomfort mingled with delight. His pictures can be distinguished from those of other Venetians almost across the width or length of a church. They call one, as with clarion march music, with their vivid, unusual tints. The sapphire-blue and geranium-red (as of the hedgerows of Tangier) of the Virgin's robe; the meadow-green and shot-orange with which these are balanced; the exquisite rose color and lilac, which make certain groups of fluttering angels like hyacinth plantations in spring; nay, the whole picture, the lovely ivory-faced Virgin on her throne, the blond Sebastian, with the first down on his cheeks, the dark, passionate Roch, the stately SS. Barbaras and Catherines, palmed and towered into so many human or celestial flowers. This man loves — which is uncommon in great painters — beautiful things, not merely things which look beautiful when painted. His women are exquisite, not merely in hair and skin, but in body and features, delicately carved of living ivory. His draperies have dyes of gem-like depth and vividness, sapphire-blue and marvellous lacquer scarlet; and he studies plants for their beauty and pleasantness, not merely for decoration and suggestion. The fig-tree, for instance, and the painted jasmin, from under a hoop of which there appears in one of his pictures here the majestic stretch of the River Serio, merging into the hazy blue-green plain surrounded by the hyacinthine mountains of Bergamo.

Even more noticeable in this highly-strung, over-excitable artist is the romantic, imaginative light in which he sees actions and men, making him place the rose petals and ivory skull beneath the hand of the man in black, in the Borghese collection, the rising moon and poppy-like plumes about the malignant lady in the gallery here, insisting upon the element of hidden pathos or trouble in all his sitters, and compose his religious pictures not, like the other Venetians, as solemn liturgic pageants, but as rapid, unclutchable visions born of ecstatic hope.

"Look at this composition," says my friend K——, taking me up to the enormous altarpiece at San Bartolomeo. "At first you will think, as I did, that the Madonna's throne is placed in the mouth of a cavern. You are intended to perceive only gradually the rows and rows of columns receding into a dark church, and the groups of saints round the foot of the throne, half of their bodies in penumbra. They seem so tired of waiting, and to have just perceived the Child who has sprung up on His mother's knee like the tiny ray of supernatural sunshine which flickers round His head. He is craning forward eagerly to bless all those saints; but, for all their passionate expectancy, they are frightened now the fulfilment, after so much weary waiting, has come. You feel they have been praying and waiting too many centuries, alive or dead, and the bright colors of their clothes are all dimmed, so that only the Virgin and Child flash as a vision in red broken with blue. Then there is the extraordinary invention of those two baby angels below the Virgin's throne, unfolding a dark, veil-like drapery, whose folds sweep round in front of the throne to make a path back into the gloom, to suck the vision back."

He has also his purely romantic, Ariosto, or rather Tasso-like, vein. Yesterday we spent the afternoon at the villa of Trescore, where our host, Count Gianforte Suardi, possesses a lovely little chapel entirely painted by Lotto. The fancy of this is curiously far-fetched; out of the hands, extended in blessing, of the Saviour in the keystone, grows a great vine, whose twisting branches and tendrils cover the vault and walls, hiding cherubs in its trellis, framing medallions of virgin martyrs in white nuns' vestments and brilliant Venetian dresses, and enclosing groups of small figures and elaborate landscapes. These irregular compositions are marvellously romantic: brilliant men-at-arms and horsemen pursue flying damsels through city squares, pillared and fountained, among hill pastures and little groves. Magnificoes sit in judgment, and tyrants imprison and scourge their ivory nakedness, and angels come to rescue. Stories of Christian martyrdom, turned into Ariosto stories of Angelicas and Isabellas.

(To be continued.)

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

CHURCH OF THE HOLY COMMUNION, WASHINGTON AVE. AND 28TH ST., ST. LOUIS, MO.

[Gelatine Print, issued with the International and Imperial Editions only.]

THE Rector of this church kindly sends us the following statement:

"The original architect who designed the church of the Holy Communion, St. Louis, was the late Henry G. Isaacs. He intended to build the chapel at the rear of the lot, and afterwards to erect the church on the ample grounds left for the purpose. But, unhappily, several gentlemen who thought they understood the business of an architect better than himself, ordered the south wall of the chapel to be cut out, and the nave added. The result was a building of 900 sittings, and only 350 out of the whole number in which a continuous sentence could be heard.

"In 1886, Maj. Francis W. Lee remodelled the whole church; put in a reredos which corrected all acoustic defects, but reduced our sitting capacity to 500; and making a most beautiful house of worship. In 1894, an east porch which obscured the lines of the building was removed and a vestibule was added on Washington Avenue, which we think has now brought the church to as near perfection as is possible, in view of the fact that it has been built and changed and remodelled and pulled to pieces, and remodelled at an unnecessary outlay of money. If I might make a suggestion to an architect, I would advise him to refuse any contract to build a church, except

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under the absolute pledge that after the plan is adopted, the architect and not a vestry shall dictate what is to be done. So only was Major Lee able to make the perfect success which he has."

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"ITTON COURT," MONMOUTHSHIRE, ENG.: FOUR VIEWS. MR. E. G. DAWBER, ARCHITECT.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

ON THE GIVING OF BONDS BY ARCHITECTS.

June 22, 1896.

To the Editors of the American Architect:—

Dear Sirs, — It is with some pleasure and many regrets that I read your editorial in the June 13th issue in regard to bonds furnished by the architect for the hospital at New Jersey. Pleasure in that, if the dangers are pointed out soon enough, architects may take warning and be on their guard when such demands are made; and regret that this practice has already extended from Minnesota to the State of New Jersey, and to Montana later. I do not think that all of the dangers involved have been shown by you, and it remains for reputable architects to determine whether the profession shall retain its hard-earned reputation for honesty and integrity, or shall acknowledge that the profession is, as a rule, corrupt and its individual members must be put under bonds that the public may obtain faithful performance of duties. The obstacles placed in the path of the architect are already so numerous that it makes a conscientious man tremble when he realizes his responsibilities, and with this new menace staring him in the face the architect will surely be at the mercy of his friends as well as of his enemies. It is a fact that very few people know what "full services" consist of, and are inclined to claim more than they are entitled to: neither do they appreciate the same when faithfully given. It may be well enough to say that the architect should give faithful service, and of course such is expected, but is it not a fact that the layman is at present the only judge of such faithful performance of duty, and many times through ignorance and sometimes from malice decides against the architect, and often the courts uphold such unfair decision. The requirement of a bond to insure faithful performance of duty seems to me such an insinuation that no reputable architect could accept a commission and give bonds without acknowledging his incapacity and at once placing himself on the lowest level in the profession, and one who does accept must acknowledge that he has dealt the profession a blow that it will not recover from in many years, if ever. It may, before long, be the general practice to require bonds from architects for all work, and when such time arrives it will be well for the architect to be his own builder, that he may receive the profits of the builder, and at the same time avoid the dangers that are liable to arise through the action of outside parties whose interests are directly opposite to those of the owner and architect. It is probably a fact that few architects realize their legal responsibility in connection with building, and with the newly added burden, not only the architect but his friends must suffer for imaginary grievances of those disgruntled, designing, dishonest and ignorant clients, who do not know, or who do not want to know, of what the faithful performance of duty consists. It is to be hoped that this iniquitous practice will be stopped before it extends any further. The question of professional ethics has been considered for many years by the profession, but this new danger seems to me to surmount all other questions that have ever been considered, and without a doubt the A. I. A. will before long be obliged to give the matter careful consideration. Very truly yours, A. Freeman.

CORRECTIONS: "LITERATURE ON THEATRES."

Chicago, June 29, 1896.

To the Editors of the American Architect:—

Dear Sirs, — I notice in your "Literature on Theatres," compiled by Mr. Gerhard in your number dated June 27, 1896, that the "*Treatise on Theatres*," by Saunders, is given and the date is incomplete.

On referring to the copy of the book which I happen to have, I find that it is by George Saunders, dated 1790.

Very truly yours, James R. Willett.

[We will in this connection also draw attention to the fact that certain French works were, in overrunning the list into alphabetical order, accidentally placed under the heading of works in the Italian tongue. — Eds.]

NOTES AND CLIPPINGS

Artisans' Colonies. — According to Robert Donald, editor of *London*, artisan colonies near great cities are, from an economic, educational and municipal point-of-view, a mistake. It is not surprising, in his opinion, that such places as West Ham and Tottenham should desire to be incorporated in London. Of Tottenham, a place with a population of 100,000, he says it "is nothing but a great dormitory for London workmen. They start early in the morning; they return late at night; they take no interest in their system of government, and have no opportunity of participating in it. The place is run by jerry-builders for jerry-builders. A colony of workingmen, isolated from the place where they labor, must necessarily be a poor community. The houses are of one low dead level of value; and the lower the assessment the higher the local taxation. In Tottenham, West Ham and Edmonton — all residential districts for artisans — the cost of local government is 50 per cent of the value of the houses; that is, if a man pays £10 a year in rent he will pay about another £5 in purely local taxes. And what is worse, there is extremely little to show for the money." — *N. Y. Tribune.*

A Teredo-proof Pile. — The Board of Harbor Commissioners of San Francisco believes that it has at last found a pile that will withstand the ravages of the voracious teredo. An ordinary fir pile driven in April, 1894, and the teredo-proof pile driven in October, 1886, were both taken up in April, 1896. The common pile was so badly damaged by the inroads of the teredo after having been down but two years that, when laid on the wharf, it broke in two with its own weight. The teredo-proof pile, which had been driven for nine years and six months, was found to be nearly or quite as sound as when it was first driven. Its form of construction is simple. In the centre is a piece of timber six inches square, about which are secured strips or boards secured alternately at right angles to each other until the proper thickness of diameter for the pile has been reached. In building the pile the centre core is first smeared with a preservative compound made of either asphaltum coal-tar or some similar substance that prevents the decay of wood. The strips are then nailed on opposite sides of the core, being first coated with the preservative compound. The outer surface of the completed pile is protected by an exterior coating or layer of the preservative compound. — *San Francisco Call.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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IN regard to the question of requiring architects and engineers to give bonds, there is a little to be added to what we have already on the subject. In nearly all cases these bonds are demanded, not to secure the proper performance of the duties of the architect or engineer, but to force him to guarantee that the contractors shall be faithful to their agreements, or, still worse, that the cost of the work to be done, including an indefinite number of contingencies over which the professional adviser has no control, shall not exceed a certain amount. In either case, the giving of such a bond carries with it consequences of the greatest importance to all the parties. From the moment that an architect or engineer becomes responsible for the carrying out of the contract, or for the completion of the work for a fixed sum, he loses more or less, depending on the wording of his engagement, of his professional relation to his client, and becomes himself the contractor. In this capacity the law recognizes that his interests are hostile to those of his employer, and will support him in maintaining his hostile interest. As a professional man, simply, he could be discharged at any moment, upon payment of a fair compensation, but as guarantor of the contract he cannot be so easily got rid of. In the eye of the law, the money question is always paramount to all others, and an architect who has agreed in writing with his client for a fixed reward to warrant the completion of a certain contract for a given sum is entitled to continue in charge of it to the end, whatever may be the artistic horrors that he inflicts upon his employer. Moreover, if horrors are cheaper than beauties, he may lavish them with unsparing hand, and his client can neither get rid of them nor of him. Where an ordinary architect is ready to consult his employer's taste, to show him sketches, and to do his best to gain credit for both by the artistic success of his work, the architect under bonds cannot be expected to do anything of the sort. If he were to show sketches to his client, or consult him in any way, the latter might wish for something that would not be the cheapest possible thing of the kind, and there would be a controversy, in which the architect, as guarantor of the cost, would prevail. Even the direct and positive orders of his client as to the details of the work will be unavailing against an architect under bonds, so long as the architect keeps within the letter of the specification. The man who guarantees the cost is the one to say how the work shall be carried out, and the owner, as the person whose evident interest it is to get as much as he can without paying for it, will soon find that judges and juries alike will interfere to prevent him from satisfying his tastes at the expense of other people.

IF the client persists in imposing his wishes upon the architect, in spite of the latter's protest, the bond agreement is rendered nugatory and the architect is released. Of course, in order to establish the rescission of such a document as a bond, it would be necessary to prove very clearly the interference of one of the parties to the instrument with the discretion of the other in carrying it out, as well as the formal protest of the latter; but, if these were proved, the legal conclusion would be inevitable that the contract formed by the bond had been rescinded, and that the injured party was not only released from further obligation, but could, perhaps, demand damages for being prevented from carrying out his agreement in his own way, just as the builder could claim damages if the owner should interfere with his operations. It is hardly necessary to point out how seriously this transformation of the architect, from a confidential expert adviser into a hostile contractor, injures the interests of his client. Under the ordinary professional engagement, the architect applies the skill acquired by years of study and practice to the single object of securing for his employer a well-designed and well-constructed building, defending him constantly, in doing so, against the carelessness and dishonesty of the various mechanics who take part in the work; while, by putting him under bonds, it is made his sole interest, and his legal duty, — for the law imposes upon every man the duty of taking care of his own pecuniary interest, so far as he can do so honestly, — to prevent the owner from making any change, or indulging any fancy, which may vary a single item of the specification which he has guaranteed to see carried out, and, where it is necessary to give an interpretation to any part of the drawings or specifications, to give them that interpretation which will best suit his interests, rather than those of the owner. For a time, it is probable that architects and engineers, whose habit it has been for a hundred years, at least, to consider themselves the trusted professional advisers of their clients, would, if the practice of requiring bonds should spread, endeavor to unite a professional position with that of contractor, but this could not last, and the ruin of a portion of the members of the profession would teach the others how to defend themselves. This they could do, if they should be forced to it, with tolerable efficiency; for, if the architect and the owner together cannot always prevent the builder from pocketing some undeserved gains, the owner alone would be absolutely helpless against the combined ingenuity of the architect and the builder pursuing together their lawful duty, that of making as much money out of the contract as lawfully possible.

IN recording the appointment of Mr. Arthur G. Everett as the architect charged with the restoration and preservation of the Bulfinch portion of the Massachusetts State-house, we hope final reference is made to the trials and dangers that have afflicted the building itself and the heart-burnings that have pained its friends. We have been somewhat persistent in keeping this matter before the profession, realizing how widespread and real was the interest in the fight between art and sentiment on the one hand and "business common-sense" on the other, and the very effective and spontaneous protests forwarded to the Legislature by architects in all parts of the country at the crucial moment bear witness to the reality of the interest architects have in this particular monument. As the Acting-Governor and his advisers understood that the architects of Boston had waged the battle disinterestedly and not selfishly, they desired to recognize this fact publicly by placing the work of restoration in the hands of a commission, but as the letter of the legislative act called for the appointment of a single architect, it was necessary to nominate Mr. Everett alone, but with the express understanding that for this work he should associate with himself Mr. Robert D. Andrews and that Mr. Charles A. Cummings should act as consulting architect. In this somewhat roundabout way a most admirable and efficient commission is entrusted with the work, any one of whose members is entirely competent to do the work alone, and yet all are so thoroughly in agreement as to what to do and how to do it and so representative of the profession in Boston that it will not be possible for any one to do anything but applaud the appointment. Mr. Cummings, to whom more than to any one else is due the salvation of Bulfinch's work, has consented to act

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as consulting architect only on the condition that it should be explicitly stated that he could accept no remuneration for services which he had rendered, and would still render, in a spirit of complete unselfishness and devotion to the demands of patriotic and artistic sentiment. The present State-house Commissioners will sustain towards Mr. Everett and his coadjutors the same relation they have borne to Mr. Brigham, the architect of the Extension.

ACCORDING to the New York papers, a singular state of things prevails in the freestone trade in Brooklyn. Not long ago, a suit was begun in the Supreme Court of the State of New York, against the Freestone Dealers' Association of the City of Brooklyn, claiming fifty thousand dollars damages on account of the interference of the defendant Association with the business of the plaintiffs. It appears that the plaintiffs, who are comparatively young men, and experienced stone-cutters, had saved a little money, and proposed to go into business for themselves as cutters and dealers in freestone. Knowing of the existence of the Association, and some of its rules, they made application for admittance to it, accompanying their application, as the rules provide, with a certified check for five hundred dollars, to be held as surety for their compliance with the regulations of the Association. The check was returned, and the application refused, on the ground that there were too many firms already in the business. Some time later, a second application was made, and subsequently a third, but both were refused. Notwithstanding these repulses, they went on with their business, but were unable, and are still unable, to buy from quarrymen any freestone whatever, and they have had to buy and re-cut second-hand stone to fill their orders.

THE explanation of this is, as the aggrieved parties say, that the Freestone Dealers' Association includes the quarry-owners, and the latter are pledged to sell stone only to members, under a penalty of five hundred dollars for the first violation of the agreement, and expulsion from the Association for the second; while, as all the members are pledged, under similar penalties, not to buy stone from any quarryman or agent who does not belong to the Association, expulsion from its ranks means total loss of Brooklyn trade. Worse than this, it is alleged that, although the power of the Association has been sufficient to raise the price of rough freestone from the quarry to a dollar and ten cents per cubic foot, the dealers, taking advantage of the completeness of their monopoly, have united in refusing to employ union stone-cutters, or pay union wages, so that the Brooklyn stone-cutters, in order to get employment, are obliged to work for the Association members at little more than laborers' wages. Considering the vast areas of untouched freestone territory in Massachusetts, Connecticut and New Jersey, it is strange that dealers who are not members of the Association should not unite to open quarries for themselves, and get the advantage of the exorbitant prices established by the Association. They would, apparently, have the good will of the unions, for, already, a struggle has begun between the Association dealers and the combined building-trades, which has gone so far that the bricklayers will not back up stone furnished by any member of the Association.

PROF. J. H. MIDDLETON, the Director of the Art Museum at South Kensington, and one of the most learned men of the time, died a few days ago at a comparatively early age. Professor Middleton is best known to the architectural world, probably, through his book on "*Ancient Rome*," a work of immense erudition, although some of his conclusions are not universally accepted by archæologists. According to the New York *Evening Post*, Professor Middleton was sent to school, when a boy, at the convent of La Cava, near Naples. The present Pope, Leo XIII, was at that time one of the tutors in the school, and it is quite probable that the great English archæologist and historian of art may have received his first encouragement from the scholarly and learned priest who was to become the head of the Roman Church. Professor Middleton married an American, the daughter of Mr. W. J. Stillman, once an artist well known in New York and Boston, but now for many years resident in Rome, and a distinguished critic and amateur archæologist.

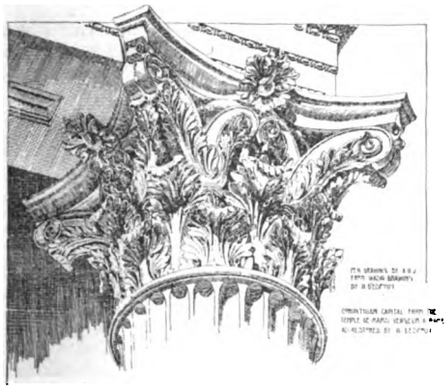
ANOTHER distinguished archæologist, Dr. Isaac Hollister Hall, died at his home near New York a few days ago. Dr. Hall was Curator of the Metropolitan Museum of Art, and Lecturer in Johns Hopkins University. He was a Professor in the Protestant College at Beyrout, Syria, for two years, and possessed a profound knowledge of the Syriac, Phœnician and Cypriote languages, having been the first to read an entire Cypriote inscription.

THE *Engineering Record* makes some comments on Professor Fernow's last circular, on the tests of Southern pine timber, to which Professor Fernow makes a reply, both the comments and the reply being interesting reading. The *Engineering Record*, apparently forgetting that the circular explicitly states that the tests recorded are not to be taken as commercial tests, warns its readers that the pieces experimented upon were all selected, and, as nearly as possible, uniform, so that for ordinary timber, containing an indeterminate quantity of water, concealed knots and other imperfections, the coefficient of average resistance could not, in practice, be taken at more than two-thirds the values given in the circular.

PROFESSOR FERNOW, in his reply, explains very forcibly the difference between the scientific tests which he has been carrying on, and the commercial tests which, as is of course obvious, are those which engineers and architects would at present use. It is true, as he says, that random sticks of large timber will break under a strain not greater, perhaps, on an average, than two-thirds the breaking strain on a selected piece; but it is equally true that, although the average of strength may be low, some of the random pieces are likely to have nearly the normal strength, while others will fall below the average; and, as there must be reasons for this, it is plain that, if the engineer understands these reasons, and can tell by inspection which of his timbers will have the normal resistance, and which will fall below it, he can utilize his material with far greater economy than is possible under a practice which applies the same average coefficient to good and bad timber alike. It is with a view to increasing our knowledge of the conditions affecting the strength of timber that his tests have been made, and careful selection, and uniformity in the test-pieces, were indispensable to an investigation which has for its object the establishment of data by which the influence upon the strength of a timber of a given number of knots, or a certain proportion of sapwood, or a given condition of moisture, can be calculated with reasonable accuracy. From a scientific point, and, indeed, from a practical point, Professor Fernow's position is the true one. As compared, for example, with our knowledge of iron, our physical data in regard to timber are ridiculously inadequate. An engineering club would have a hearty laugh at the expense of any one who should test miscellaneous bars, of high and low steel, cast-iron, and wrought-iron of various qualities, collected at random from a dealer's stock, and should average his results, and apply the average coefficient, with a factor-of-safety of six or eight, to all the structural metal with which he had to deal; yet this proceeding would not, in itself, be more unscientific than our present practice in regard to timber. The usual plea in apology for this practice is that the defects in timber are "concealed," so that allowance must be made for them, whether they exist or not; but Professor Fernow's tests are made for the precise purpose of enabling us to detect defects, and to determine their influence, just as we are enabled now to ascertain the tensile strength and elongation of a lot of structural steel, and to proportion our sections accordingly. No doubt, there will be some difficulty in devising methods for determining the presence of knots or internal shakes, and modifying the coefficients of resistance accordingly; but the problem is no more serious than that of ascertaining the proportion of carbon in mild steel, and fixing its probable coefficients of tensile strength, compressive strength and elasticity in accordance with the results of the analysis. The latter problem is solved every day in scores of testing laboratories; and it is not too much to hope that Professor Fernow will, before long, enable us to solve the former even more readily. That the matter is of extreme importance hardly needs to be repeated. If we could tell accurately, by inspection, what pieces of timber would show the normal tensile or transverse strength, so as to be available for floor beams or ties, and which should be used only in compression, a great saving could be made in structural work, amounting, probably, to many millions annually.

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SELF-HELPS.



THERE was a tradition current among some of my draughtsman friends at the time when we were all looking forward to the possibilities of architecture as a means of both pleasure and profit through life, that an architect could not grow in his profession after he had started in business, or to put it in another way, that an architect should do all of his studying while still in the inceptive state, for the cares of business and the responsibilities of decision would render it practically impossible for him to expand after the gait had once been set. This belief was undoubtedly inculcated by some wise educator as an incentive to young men to study and improve to the utmost their abilities, or perhaps as a restraint to hinder them from rushing into business before their wings were fledged. Unfortunately, we are every day made aware that some architects do not grow at all and that the style of work with which they started at the beginning of their careers is the style to which they still adhere; but they are the exception rather than the rule. Certainly every architect who prides himself at all upon being abreast with the times feels that, however far short he may fall of what he would be, it must be a poor year which does not mark some development of his power and some addition to his positive available knowledge and experience. Growth in architecture, as in nearly every other mental function, comes by infinitesimal increments. We do not know in advance what will help us, nor can we always rightly appreciate the value of experiences while we are in the midst of them; and yet no one can look back over even a short period of professional activity without a consciousness of gain by some experiences and of loss by the lack of others. After the architect has left school and has hung up his shingle, he is dependent entirely upon himself for his incentive. He has no earnest teacher to prod his lagging thoughts, nor is there a zealous employer behind his back to keep him up to a little higher pitch than he appreciates himself. His growth can come only from within, and he is obliged to call to his aid such self help as his temperament and his opportunities can command.

The first aid which naturally suggests itself is constant and varied use of the perceptive faculties in making drawings, sketches, water-colors, etc. An architect has to think through his pencil and pen, and if the thoughts are clogged, if the ideas stick at the point, though the results may be satisfactory, there is a loss by friction, and he who can express his ideas readily on paper has a tremendous advantage over the one who may have, perhaps, more brilliant conceptions but is less able to make them of tangible value. But there is no royal road to good draughtsmanship and it is not wholly a gift. It requires constant practice to even keep what one has, and though I would not set draughtsmanship at the head of self-helps, nor claim that the capacity of an architect is measured by the beauty of his drawings or the facility of his hand, constant sketching is a necessary adjunct of continuous growth. In the cares of professional life it is very easy to drop the habits one may have acquired as a student, and to feel that there is nothing about the office and little in our relatively uninteresting streets which can inspire us with the pictorial enthusiasm which possessed us in Europe. Quarter-scale and full-size details of actual work are less interesting, but they seem more necessary and it requires a good deal of dogged determination for one to regularly devote a certain portion of each day to making some sort of sketch or drawing. And yet the habit of daily sketching is one which none can afford to neglect. Draw from photographs; make pastels, water-colors, or, even better, occasionally draw from life; but there must be some kind of persistent oft-repeated use of the imitative faculties in this line, or they will soon lapse into the rusty condition which the younger men are so inclined to designate as peculiarly the quality of their elders.

Then the earnest seeker for growth must study the beautiful in all its manifestations, for beauty is a fundamental necessity of good architecture. I do not mean merely the beauty which finds expression in stone and brick, and iron and brass, but also the beauty which lingers around the setting sun, which paints the lily or adorns the rose, which gives its subtile charm to Rosetti's poems, or crowns with glory the canvas of Chavannes. The subtile, æsthetic sense which makes life enjoyable, the beauty of form, of face, of thought and of action, all reflect directly upon the beauty of architecture, and the man who is keenly alive to the one is most apt to bring out the other in his work.

And still in the line of studying the beautiful, we cannot afford to neglect the exhibitions of paintings and drawings which every year are becoming more frequent among us. We cannot miss one of them without loss. It is not such a very far call from Simons or Monet to quarter-scale drawings, though the connection is often missed and the correlation of ideas not appreciated. An honest attempt in any department of art can be studied to advantage until it awakens a responsive echo in the architect, and thereby his horizon is enlarged, his appreciation intensified, and his own art the better understood.

Architecture is so essentially imaginative in its highest expressions that a great deal of help can come from a course of imaginative reading. We are too prone to be matter-of-fact even at our best. The irksome requirements of actual practice tend so often to crush out the dreamier qualities which go with every flight of the imagination, that in the rush of business we may forget the satisfaction and the real growth that might come to us by at times following the intellectual revelry of a work such as the "*Arabian Nights*," "The Ancient Mariner," Prescott's "*Conquest of Mexico*," or Rudyard Kipling's "*Jungle Stories*." Indeed, I know of no better literary antidote for architectural affectation than to travel with Mowgli through the romantic imagry of the jungle, letting our fancies run their own pace in a world which is new to us, leaving us with a clearer vision and a truer perception for the practical, tangible art with which we have to grapple. If I were obliged to choose between fiction and Viollet-le-Duc as a course of reading for an architect, my reason might carry me to the latter, but I firmly believe more growth would come in the long run from a little literary dissipation than from scientific indigestion.

Now all the foregoing means of self-improvement are quite as available for the draughtsman as for the architect, but there are some ways in which the architect is peculiarly able to profit by other people's experiences and ideas, and to help himself into a more fitting condition. I believe that every architect should set out as his rule, first and always to build to suit himself and to have the courage of his own convictions; to resolutely determine to give his clients not what they think they want, but what they really ought to have; to study each problem which comes before him as if it were his own, as if its solution rested with him alone, and never to allow himself to put out a piece of work of any description with which he is not perfectly satisfied. This may seem an impossible rule of conduct: exigencies do arise which oblige one to temporize; architecture is very often a series of compromises; and yet I firmly believe that the growth of the architect is quite closely in proportion to his independence of thought and to the extent to which he succeeds in doing nothing but his best. One of our foremost architects makes it a rule never to let a drawing go out of his office until the copy thereof, which has been made for office reference, is, at least, as good as the original. This means a constant struggle, but it also means that the standard is kept up and the work of this particular architect amply repays the pains he takes with his drawings. A client wants something done in a hurry; we are human enough in many cases to give him what he wants, when our manifest duty to ourselves and to our profession is to stand up and resolutely refuse to be rushed or bullied into doing anything but what we believe to be the best. This is a point which personal experience will fully endorse and from hardly any other source can there come so much real tangible growth to the individual.

The foregoing should not imply a blind persistence in our own ideas. We ought on every possible occasion to measure ourselves with our professional brethren. It is so easy to get into a rut, to acquire mannerisms and special little ways of meeting problems, or, perhaps, one special way of meeting all problems, which is worse yet, that if we are to grow we must see how other people grow, we must compare our work with theirs; if possible, see how they solve the very problems which we have set out for ourselves, and comparatively criticise their work as our own, not to find faults but to find the strong points. Criticism either by ourselves or by our friends or enemies is seldom enjoyed among us. We have plenty of expression of opinion, but architects, like so many other professional men, are prone to draw about them a shell of reserve and to repel rather than invite criticism, so that we often lose one of our great incentives to growth out of our narrow ruts and personal convictions. But even if we are not so fortunate as to have friends whose judgment we can trust and who will honestly and fearlessly criticise our work, we can, at least, criticise it ourselves. If an architect upon the completion of a piece of work would sit down before it and write out in tangible shape what are the good points and what the failures, wherein it fell short and in what respects it might have been better, in how far it was a work of the imagination and to what extent the practical drudgery overcast the æsthetic idea, whether it fulfilled its functions or was only a picture, whether it was well constructed, well balanced, well arranged and well designed, or a mere fortuitous agglomeration of ideas more or less inchoate, — in other words, whether it was real architecture or only the species of graphical juggling which Fergusson condemns as so peculiarly American, — such a process of keen, unrelenting self-criticism, though it would doubtless make many of us profoundly dissatisfied at times with ourselves, ought to lead to the best results.

But more than anything else, if one is to grow, time must be taken for sober, conscientious thought. It is peculiarly characteristic of this age and of this country that we do not think; that in the turmoil of the daily struggle for existence, the race for the prize which is ever just beyond our grasp, we will not commune quietly by ourselves for a few moments each day and think over what we shall do

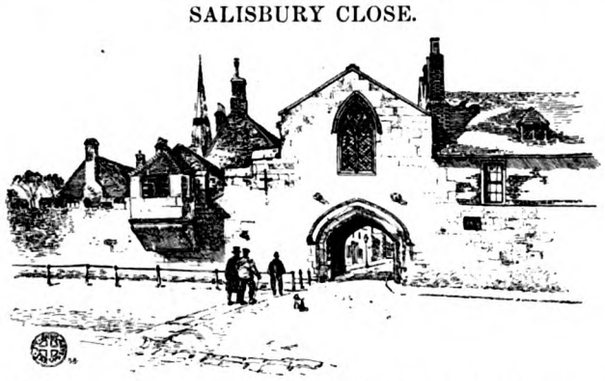
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or what we have done. And yet I believe there is no one quality which will so conduce to architectural education in the broadest sense as a daily habit of quiet contemplative thought. We design our buildings in a hurry; we build them with a rush, and we close the accounts and forget the problems before the mortar is thoroughly set. The first idea which comes into our head is too often the one which finds perpetuation in the building, to stare us in the face in after years and accentuate our regret at lost opportunities. There is with us very little of the calm well-balanced selection and dignified habits of reflection which brought into being the early Italian Renaissance. There has never yet been found an architect who would refuse a good job, no matter how many he had on hand; there is always room for one more, and if we haven't time to think out our problems as we should, if we cannot give them the careful consideration which we know they deserve, if we fail to profit by the lessons they teach, it surely is not because we do not know better, but, rather, because the whole trend of modern civilization is to destroy or nullify the thinking faculties. I well remember the advice which was given by one of the brightest English architects to an American who was on his way to study throughout Europe on a travelling-scholarship, the whole point of which was that the student need not concern himself with the number of sketches he made nor with the number of drawings he elaborated, nor the number of miles covered in journeys, but that he had better pick out some thoroughly good building wherever he got a chance, sit down carefully before it and study it until he felt its whole being and appreciated the why and the wherefore of all that he saw, until the secrets of the structure were his; and then he could write back to his friends in America that he had not done much sketching, but he had done a powerful lot of thinking. Now I believe no architect ever gets beyond the point where thought can be disregarded. Even the most clever of our designers would benefit by setting aside a certain time each day which would be entirely their own to think and plan their work, to ponder on what might be done and to weigh and measure the results of past attempts. If we are to grow we must think, we must rid ourselves from the frantic desire which every architect feels at times, to get ahead of his work, to have some money laid up in the bank, or to put some jobs out of the way. Life is too short and the rewards too uncertain for us to afford to throw away the enjoyment of æsthetic self-gratification. We want to do our best, and most people feel they could under proper circumstances, but those circumstances never come until we are ready to think them out and until our minds are in the receptive condition in which we can appreciate the peace and the quiet and the rest which ought to find manifestation in every well-balanced building.

So that, while in order to keep our architectural language we need daily practice in sketching; while we need to cultivate our imaginations; while the beauty of nature in every form cannot appeal to us too strongly. Above all, we must think; we must cultivate ourselves and the talents that are in us; discover wherein our strength lies and in what direction we fail; and then by sincere, sober self-criticism we may help ourselves to the thoughtful, scholarly condition which is pretty sure in the long run to result in honest and intelligent work.

C. H. Blackall.

SALISBURY CLOSE.



PASSING under an archway at the head of the High Street, and moving on clear of the houses and trees, you stand within the Close of the Cathedral of Salisbury. There is a wide level of fresh greensward within a border of noble trees, and out of the middle of the velvet turf rises a wonderful mass of gray walls and gables, and a soaring spire. You have before you the most glorious achievement of England's Thirteenth Century, and, as your Fergusson tells you, "one of the best proportioned, and, at the same time, most poetic designs of the Middle Ages" — a great church built in one time and all in one style, completed within the forty years from 1220 to 1260, entirely Early English, except as to the tower and the lovely spire, which are a little later, almost without a trace of foreign influence, as Mr. Fergusson has determined, and the great model of the cathedrals of England.

Were it the first English cathedral one had seen, there might be at first a sensation of some disappointment in the seeming lack of height — an effect the more apparent to an observer accustomed to the churches of France — but, gradually, the perfect harmony of this building makes itself felt and the beautiful proportions of its members as seen from this, the north side, will convince one that certainly in the point of exterior grouping no foreign church excels it. As to grandeur of interior, however, it will not be maintained that any English church quite equals the great French cathedrals. The interior of Salisbury, indeed, strikes one as cold and color-



Houses on the Close, Salisbury.

less. The very homogeneity of style tends to monotony and the lack of painted windows is felt. There are fewer chantries, screens, monuments and chapels than elsewhere, these having been removed to a great extent in the restorations by Wyatt, made about the beginning of this century. Sir Gilbert Scott's work, in our time, confined itself fortunately more to making safe the old work where necessary. I have seen several churches which have been restored extensively by Sir Gilbert Scott, notably the Cathedral of Exeter, one of the most beautiful interiors I have had the fortune to enjoy, and the fine Perpendicular church of St. Mary Magdalene in Taunton. One thing he did at Exeter, setting the organ atop of the rood-screen, where it cuts off the view of the choir and mars the effect from the nave of the ancient glass in the Perpendicular east window, has been condemned. But the organ is a fine old instrument, built in London in the time of Charles I, and its mellow voice is heard with splendid effect from this position, which is evidently exactly the right one from the point of view of the acoustics of the church.

As you walk to the east along the boundary of the Close you get a striking impression of the great length of Salisbury, enhanced by the low height of roof. The wall is relieved by the north porch, then by the transept proper, the northwest transept, the church being a double cross in plan, then the northeast transept, the transept of the choir, and ends with the square east end and Lady Chapel, in which features, departing from the apsidal form of the Norman churches, this church established one of the striking divergences of English Gothic.

The gray walls rising from the green turf are soft and lovely in color. The spire, tapering up from the tower to a height of over four hundred feet, holds the eye with its grace. There are broad belts occurring three times in its height, ornamented with a geometrical decoration of crossed diagonals, making diamond panels with bosses in the centre of each.

Much has been said of late in this journal about the insecurity of Salisbury's spire. It is sincerely to be hoped that the Cathedral authorities are doing everything in their power to secure the permanence of so rare and beautiful a creation of the great past. The problem is one which has taxed the skill of Scott and other lights of modern constructive science.

It is, however, rather the houses about the Close than the church itself which make the subject of this little paper, in apology for which the four accompanying sketches are offered, but it was not possible to turn to the houses without first making our reverence to the great ecclesiastical monument which stands hoary and venerable in their midst.

The most important of the houses looking upon the Close is naturally the Deanery, the residence of the Dean, the first functionary of the Cathedral establishment, and a personage of usually the greatest eminence as well in society as in the Church. South of the Deanery, and also looking toward the west front of the Cathedral, is a very notable house of the fifteenth century known as the "King's House" and built as a royal lodging in which the churchmen of the time occasionally entertained the monarch. On the north side is the "King's Wardrobe," also dating from the fifteenth century, but why so called I am not now able to remember. These houses have considerable interest as good examples of domestic architecture of their day. In the mass they are dignified and beautiful, and in detail their gables, bays and oriels, mullioned windows, arches and doorways are worth studying.

Their generous openings give light in plenty to the spacious rooms, and they are altogether handsome liveable mansions.

They are all built of stone, rough-faced in the broad surfaces of wall and sometimes chequered with panels of flints. The houses of this and the ensuing century are assuredly the most beautiful results of English domestic architecture. They are quite suited to modern needs and will always be models, especially for country

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houses and residences in the quieter towns. Many contemporaneous British architects are doing fine work on the same lines, notably Ernest George, who is a master of the style.

About the balance of the Close stand other interesting and picturesque dwellings, and toward the St. Ann's Gate is a row of houses dating from Queen Anne's time to that of the Georges, of which period we have good examples in our own country.

The old gate is the centre of a picturesque group of houses, built against and on the ancient wall of the Close, the red of their bricks and tiles coming in famously with the lichened gray of the stonework.

The Close wall is itself worth looking well at, many old bits of stone from the Cathedral reparations and restorations being discoverable on its surface.

Not far from St. Ann's Gate is the White Hart Inn, a renowned old hostelry which bears little semblance of its ancient looks. Our inn was the Crown in the High Street, not far from the Gate of the Close. It bore the date 1645, and somebody of great eminence had stopped over night under its hospitable roof in that year. It may have been "Charles I, of unhappy memory." It was a quaint little place with an overhanging second story, a bar and coffee-room with very low ceilings, and a little parlor somewhere at the back where we had meals.

There lay on the window-sill in this little parlor one morning a sketch-book of most alluring appearance, whose plain gray cover seemed to be trying to whisper of treasures within. I was sorely tempted to have a peep into it, but did not, for which I am rather sorry now, for it was Walter Crane's. He was having a little holiday there, with his wife and daughter and two boys, and they were all very gracious to us. He did some sketching about the Close and I was delighted with what I saw of his rapid pencil notes of architecture, in which art he is, it is needless to say, well versed. My companion went out with him on the meadows not far from where Constable made his famous picture of Salisbury and they made water-color sketches, looking across the flat-lands and the river winding among pollard willows toward the town. I missed that day, unfortunately, but heard that Mr. Crane's work with the brush was rapid and bold and his technique broad.

We had one morning at St. Thomas's Church, where we studied a wonderfully fine old wood roof, richly decorated with carven and painted shields and angels, very like the roof of Saint Cuthbert's in Wells, lately given in the *American Architect*, and made sketches of the old tiled houses in the churchyard, a drawing of which, in color, I send with these desultory notes.

A. B. BIBB.

THE ACTION OF HEAT ON CEMENT.[1]

THE modern tendency towards large and high buildings, with a skeleton structure of steel, has made the question of fire prevention and protection one of most vital importance to architects, manufacturers, engineers and builders in general. Countless experiments have been made to devise some means of preventing iron and steel columns and girders from buckling under great heat. Plainly, the only way this can be done is by so protecting the metal that heat cannot come into contact with the metal surface.

Experiments have also been made, and numerous schemes introduced, to devise some means of making a floor between the girders that will withstand the action of fire, and so prevent a fire, even if started, from spreading from one flat to another. Hollow tile, brick and terra-cotta have been tried with indifferent success; and at present the tendency is towards using Portland cement or concrete as a protection for ironwork.

It is not the purpose of this paper to propose or condemn any scheme, or to introduce any new one; but rather to show what really may be expected from a mass of concrete or cement when subjected to great heat. The writer has carefully examined all available literature upon the subject, including books and trade catalogues; and, while many give tests which are alleged to be eminently satisfactory, still, in almost every case, the accounts give such meagre information about the tests themselves as to be almost useless, as far as information is concerned, and certainly so as far as comparisons with each other are concerned. The information as to the action of the cement itself is, in every case, very meagre; and all the information given refers only to the conduct of the system tested, and no information whatever is given as to its condition afterwards.

In making these tests three brands of cement were used — two Canadian brands: "Star," manufactured at Deseronto, and "Samson," from Owen Sound; one foreign brand, "Jossen," of Belgium manufacture. These cements were thoroughly tested for fineness, strength and "blowing" before using, and were found to be first-class. The "Star" and "Jossen" were comparatively slow-setting, and the "Samson" set very rapidly.

Tests were made upon neat briquettes and sand briquettes, mixed in proportions of one sand to one cement, two sand to one cement and three sand to one cement. The age of the briquettes varied from two months to about four years. Over two hundred briquettes were used in making the tests.

The briquettes were heated in a small assay furnace, heated by a large gas-burner, and which gave a range of temperatures of from about 650° Fahrenheit to about 1,775° Fahrenheit.

The temperatures were determined by means of a water calorimeter: the temperature of the furnace being obtained from the rise in temperature of a pint of water, in which had been immersed an iron ball of known weight, and which was heated to the temperature of the furnace. The temperatures given are approximately correct. The calorimeter gave good results — different readings, under the same conditions, rarely differing by more than 10° or 15°, which is very close for such high temperatures.

On heating the briquette and removing from the furnace, the first thing noticed was a loss in weight in the briquette; and almost all neat briquettes showed cracks, some large and some small. Some sand briquettes also showed cracks, but not to the same extent as in the neat briquettes; but there was no exception to the change in weight. This loss in weight is due to the fact that the hardened cement is a compound of hydrated crystals of aluminium silicate and calcium silicate, and the heat drives off the water of crystallization, and the loss in weight corresponds to the amount of water of crystallization driven off by the heat. Now, since the crystals depend upon the water for their formation, it is evident that when the water is removed the crystals are destroyed, and the cement ruined. Such was found to be the case in every instance.

The briquettes, after cooling sufficiently to allow handling, were broken in the testing-machine, the load being applied at the rate of about 400 pounds per minute. The result showed a marked decrease in the tensile strength; and under the best conditions, this loss in tensile strength showed an approximate proportion to the loss in weight. Briquettes which lost 19 or 20 per cent of weight, which is practically the amount of water required for proper crystallization, were practically unable to resist any load whatever, and in very few cases possessed 10 per cent of their original strength.

TABLE I.—RESULTS OF TWENTY-SIX BRIQUETTES HEATED SUDDENLY.

TEMPERATURE, 1,775° FAH. (APPROX.).

Weight in Grammes.		Per cent Lost.	Tensile Strength.		Per cent Lost.
Before.	After.		Before.	After.	
140.02[1]	125.57	10.4	530	190	64.1
139.28[1]	117.47	15.4	"	200	62.3
140.06[1]	115.75	17.3	"	185	65.1
139.07[1]	113 72	18.6	"	53	90.0
140.46[1]	125.99	11.6	"	180	66.1
140.98[1]	132.87	5.7	"	235	55.7
139.23[1]	137.68	1.1	"	330	37.7
140.11[1]	120.89	13.7	"	140	73.6
139.47[1]	133 57	2.9	"	280	47.1
139.21[1]	112.07	19.5	"	15	97.1
140.17[1]	121.17	13.4	"	155	70.7
138.71[1]	119.70	13.7	"	145	72.7
135.77[1]	131.70	2.9	930	0	100.0
133.75[2]	118.85	11.1	"	20	97.8
132.75[2]	dropped from tongs, and broke on floor.				
131.16[2]	123.05	6.2	930	50	94.6
132.76[2]	118 95	10.4	"	20	97.8
134.15[2]	128.70	4.8	"	23	97.5
139.22[3]	125.72	9.7	515	85	83.5
138.41[3]	128.39	7.2	"	75	85.4
140.00[3]	134.23	4.1	"	122	76.3
137.35[3]	135.54	1.3	"	200	61.2
138.47[3]	131.38	5.1	"	97	81.1
138.21[3]	135.68	1.8	"	185	64.1
140.04[3]	112 87	19.4	"	0	100.0
137.26[3]	113.24	17.5	"	10	98.1

[1] "Star" Brand.
[2] Briquettes, four years old, brand unknown.
[3] "Jossen" Brand.

TABLE II.—RESULTS OF TWENTY-ONE BRIQUETTES HEATED VERY GRADUALLY AND BROKEN.

MAXIMUM TEMPERATURE, 1,000°–1,025° FAH.

Weight in Grammes.		Per cent Lost.	Tensile Strength.		Per cent Lost.
Before.	After.		Before.	After.	
139.27[1]	132.34	4.9	530	395	25.6
138.31[1]	130.16	5.9	"	390	26.3
140.26[1]	128.32	8.5	"	348	34.3
140.06[1]	129.16	7.8	"	351	33.7
138.07[1]	126 23	8.6	"	327	38.2
138.04[1]	120.13	12.9	"	152	71.2
139.26[1]	116.27	16.5	"	73	84.3
138.35[1]	113 31	18.1	"	29	94.5
140.21[1]	119.26	14.9	"	110	79.0
139.32[1]	125.34	10.04	"	237	55 2
137.79[2]	129.32	6.1	515	348	32.3
139.42[2]	130.26	6.6	"	348	32.3
140.31[2]	133.58	4 8	"	398	22.6
139.27[2]	127.31	9.3	"	232	49.0
140.32[2]	120.15	14.3	"	182	64.7
138.37[2]	136.32	1.5	"	440	14.7
139.46[2]	134.31	3 7	"	400	22.3
140.07[2]	121.31	13.4	"	195	62.3
139.36[2]	117.26	15.8	"	130	74.6
140.21[2]	122.31	12.5	"	193	62.4
139.36[2]	112.60	19.2	"	10	98.0

[1] "Star" Brand.
[2] "Jossen" Brand.

The effect of different temperatures was rather peculiar. Briquettes placed immediately into a temperature of about 1,775° Fahrenheit showed a very great loss in strength for a very small loss in weight,

[1] A paper by J. S. Doble, Graduate S. P. S., published in the papers read before the Engineering Society of School of Practical Science, Toronto, Canada.

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and did not appear to follow this law of proportion between the losses of weight and strength, at least not nearly so well as briquettes treated differently. When the briquettes were gradually heated, however, and allowed to slowly rise to the temperature of the furnace, this law was followed quite closely, as reference to the tables will show. The plotted curves give a good idea of the effect of slow and rapid heating on the relation of the cement to this law. This is accounted for by the fact that the cold briquette, on being placed in the furnace at such a great heat, is immediately subjected to very considerable internal stresses, due to the expansion of the outside of the briquette before any water of crystallization at all is driven off. Briquettes, heated gradually, were not subjected to these internal stresses to nearly the same extent as those which were heated very suddenly.

An attempt was made to discover, if possible, a critical temperature to which it would be possible to subject the cement without danger of injury to the crystals, and where the cement would retain its cohesive powers. It was found that, if such a temperature existed, it was below the lowest temperature generated by the furnace, which was considerably below red heat. The lowest temperature had the same effect as the highest, excepting, of course, that with the lower temperature a longer time was required to effect the same reduction of weight than with a higher one. The lowest temperature necessary to destroy the cement was not determined, but is probably quite low. The following quotation from Heath's "*Manual of Lime and Cement*" is interesting regarding this: "Even good Portland-cement concrete, if exposed to the weather during a hot, dry summer, with no supply of moisture available, will probably be found covered with a network of innumerable hair-like cracks, which are signs of the beginning of disintegration, the natural and inevitable result of the loss of the water of hydration of the cement." (Heath's "*Manual of Lime and Cement*," page 75.)

The only neat briquettes which were not cracked by the heat were some very old ones, about four years old, which were tested. Most of these were uncracked, although some that were very suddenly heated cracked somewhat. All the newer briquettes cracked, the cracks being very large in most cases.

After cooling, the briquettes were found to be quite soft, and could easily be crushed between the fingers. This was especially noticeable in the case of those briquettes which had lost the most water of hydration. These briquettes were like lumps of dry mud or clay, and a very slight pressure was sufficient to crush them completely. Briquettes which had not lost so much water were harder, while those which had lost only about one or two per cent of water were quite hard. Of this latter class, however, these briquettes which had been heated suddenly were much the softer.

Briquettes which were cracked on removing from the furnace showed the cracks much distended and widened out on cooling, and most of those which had not cracked in the furnace showed cracks on standing for a day or two.

All sand briquettes, whether cracked in the furnace or not, entirely disintegrated on standing in air for a time, the cementing material having been entirely destroyed. Those sand briquettes which had lost most of their water of hydration disintegrated first, and those that had lost less followed soon after. Six briquettes of two sand to one cement were placed suddenly in the most intense heat, and left for about three minutes and removed. They lost from three to four per cent in weight, and two of them which were broken showed a complete loss of tensile strength; one breaking before any load was applied, and the other going at about eight pounds. The remaining four were set away, and in a couple of days commenced to crumble, the edges going first, and leaving an irregular mass in the centre. This, however, resisted for some time, but in about three weeks they also were completely disintegrated. It was thought that the sudden application of very intense heat would cause the water of hydration to be removed from the outside only, and that the inside would remain solid, and resist weathering. The results, however, showed that although the outer part of the briquettes suffered most, as is shown by the rapid disintegration, still the heat also affected the inner part, and caused its ultimate disintegration. These briquettes were too hot to be handled comfortably when weighed, after removal from the furnace, and it is quite probable that the heat still remaining in the outer portion caused a still further loss of water of hydration in the parts in the centre of the mass. The low tensile strength of these two briquettes was probably caused by the sudden heat causing great internal stresses in the briquettes. The parts of the two broken briquettes also behaved in the same manner as the unbroken ones.

A number of briquettes were heated and rapidly cooled by being immersed in cold water, after being heated for different lengths of time at different temperatures. In every case the briquettes cracked when immersed; and, if they were red-hot before immersion, they completely disintegrated — in most cases being reduced to a heap of soft mud. The sand briquettes acted precisely similarly to the neat ones; and it appears conclusive that if cement or concrete is allowed to become red-hot, and is then immersed in cold water, the effect would be ruinous in the extreme. Some briquettes were also heated, and, instead of being immersed were placed under a small stream of water flowing at the rate of about two litres a minute. The results were the same. Red-hot cement completely disintegrated. In some cases when heat had not been applied sufficiently long to heat the briquettes through and through, and where the edges only glowed, the glowing parts chipped off when water was applied, leaving an irregular mass comprising that part of the briquette which had not been heated so much. Even when not completely disintegrated, this central mass showed cracks, was very soft, and had no strength to resist any pressure.

From these experiments, then, the following conclusions may be drawn:

(1) While there is no doubt that a covering of Portland-cement concrete will afford some protection to a metal column or girder, still there appears to be no doubt that the concrete itself will be ruined by the action of the fire, and will have to be removed as soon as the fire is subdued. The concrete covering may remain upon the ironwork during a fire, but the heat will damage it to such an extent that it will disintegrate afterwards. The impression appears to exist that the concrete will be in as good condition after a fire as before. This is a mistake, as a fire of ordinary intensity is sufficient to ruin, completely, a very large covering of concrete.

(2) The concrete covering, if heated, will not stand the action of water; all the experiments show that water applied to hot cement is extremely ruinous. This is a very important point, when we come to consider the immense amount of water thrown into a building during a conflagration. The cement is certain to become red-hot; and then, when the hose is turned on, the water strikes the protecting covering, and it breaks off, leaving the ironwork bare and filling the air with a shower of dangerous falling pieces. In a fireproofed building, the usual construction is to have a system of concrete arches and slabs between the joists and girders. The walls are of concrete, and have metal doors to confine the fire, if started, to one spot as much as possible. The floor is usually cemented over, or boarded with thin flooring, and is, therefore, more or less watertight. The ceiling, or under part, might be exposed to intense heat, while immense quantities of water were being poured upon the upper portion, causing an immense strain on the concrete, not only from the weight of water, but from the opposite strains which the cement would undergo, on account of one side being expanded by the intense heat, while the other side is kept cold by the water upon it. All this time the fire below is eating away the strength of the cement, and a collapse is the result.

(3) In calculating for the design of the columns and girders, and especially for floors, no allowance should be made for the strength of the concrete, but the cement covering should be considered as so much extra load on the system. It is the usual custom, in designing a fireproof system, to consider that the concrete bears its share of the loads upon the girder; and, in a great many cases, the girder is designed on that assumption. If no fire occurs, this is all right; but, during a severe fire, the concrete loses its cohesive properties, both on account of the loss of its water of hydration, and on account of the great internal strains caused by the expansion of one side under heat, and, consequently, becomes unable to resist any stress anywhere near what it was originally able to bear, and in most cases would not even be self-supporting. The experiments have shown that sudden heating is extremely ruinous, much more so than heat gradually applied; and, in the average fire, a very high temperature is generated in an incredibly short time, and concrete subjected to its action would, in a very short time, be unable to bear any strain whatever.

It appears from this that, in a fireproof building, floors should never be constructed of slabs of cement, forming short spans or arches from girder to girder, without any support. If no load were placed on the floor, and it were subjected to heat, it might possibly retain its form, provided water were not thrown upon it; but if loaded, as any floor would be, a collapse is inevitable. Concrete, then, should always have a metal system of some sort imbedded in it, sufficiently to bear the weight of the concrete itself, and all external loads which may come upon it.

The great advantages possessed by cement or concrete, as a fire-protecting material, are its low heat-conducting power and its very small expansion under heat. These advantages, however, are entirely offset by the fact that it loses its strength under heat, is ruined by water applied during a fire, and will disintegrate after a fire, if not during the fire itself. These experiments tend to show, therefore, that the value of concrete as a fire-protecting material has been greatly overestimated, and that disastrous results may follow from confidence in a building protected with such a material.

DEAD CITIES OF THE FAYUM.

THEY are dead absolutely, not shrunk to villages like Memphis and Thebes, but as utterly lifeless as the desert which embraces them now. The sown land on whose outermost fringe they lay has shrunk within its ancient limits and left their streets and squares and roofless houses to be lost under drifts of sand.

The fact of their entire isolation and one further fact make the mounds round the edges of the Fayûm singularly worth exploring, even as sites go in the basin of the Nile. They have not, indeed, to show the remains of great cities which had a more than local fame, but of little centres of life in the richest province of Greek and Roman Egypt — small brick towns perched on slight eminences above those broad arable fields and marshes, stocked with cattle, which the papyrus tax-receipts show to have yielded so much to the imperial revenue. Trade of a sort passed through them, when

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the merchants were travelling between the home capital, Arsinoë-Crocodilopolis, and the Oases, and also they came in time to be something of health resorts; for when it was June in the Nile valley, and the river had become low and foul, the great sheet of Lake Moeris lay broad as ever in the view of these towns, and the winds of the Libyan Desert came across its cool waters. Therefore, although their walls are but of mud-brick, and they have at best a small temple apiece built of any material more sumptuous, they stood far above the rank of mere villages, and would be worth exploring even were not each so perfectly preserved under the sand as to be a small Pompeii.

But, as has been said above, there is a further count in their favor — briefly, that more than all other sites of Egypt these yield papyrus. The famous water-plant was, it seems, dirt-cheap in the Fayûm, as in the Delta; but, whereas in the climate of the latter and under its salt soils the papyrus product quickly decays, the Fayûm desert lies almost within the rainless area. In the streets and houses on its mounds, every rubbish-heap, every lumber-room, has conserved its scraps of waste-paper intact, and there is hope of lighting now and again on a little library or record office, or at least on the torn remains of some of the rolls they contained once, not thought worthy to be taken when the town was abandoned. There remains also to be added the chance of finding in the tombs a papyrus intact between the knees of the dead or serving for his pillow, or even broken up and gummed to form a *papier-maché* coffin. But so thoroughly have the cemeteries been plundered in antiquity, and so often do the graves lie in damp salt strata, that experience has shown the towns themselves to be the happier hunting-grounds.

The native dealers of Cairo and Medinet el Fayûm have long known the safe and easy sources of spoil, and have worked for the benefit of European museums unregarded and with no obligation to keep or publish records. Mr. Petrie alone has exploited any part of the Fayûm desert with a scientific object, but his efforts were confined to that corner where the Bahr Yusuf breaks through from the Nile valley. The topography of all the rest of the circle remained unknown, and the miscellaneous collections of Fayûm papyri in Cairo, Vienna, Berlin, Paris and London have lost half their interest and value from the uncertainty as to exactly where or how they had been found. It has been reserved to the English society, the Egypt Exploration Fund, to obtain the first precise scientific facts about these papyrus hoards and the first additions to our scanty knowledge of the map of the ancient Fayûm.

In December last the representatives of the society, Mr. D. G. Hogarth and Mr. B. P. Grenfell, having obtained the concession of a long strip of the northern desert fringe, went down into the Fayûm and settled on the two largest mounds east of the lake, called by the natives Kûm Ushim and Kûm el Qatl (*i. e.*, "Mound of Murder"). To this region desert routes from the north, whether from Nitria, or Alexandria, or Memphis, must have converged on their way to Arsinoë or the Lesser Oasis; and it was not long before the excavators discovered from the papyrus documents which were unearthed in the second mound that they were, in fact, on the site of Bacchias, a town set by Ptolemy (as Bacchis) on the desert road from Alexandria, and conjecturally placed hitherto by topographers in all localities but this. In like manner the first-named mound was determined to be Karanis, a name read more often on Fayûm papyri than any other, except Arsinoë, and that of the city which lies at Dimêh, but, owing to the absence of any record of the provenance of those papyri, never until now identified with any particular site. Karanis showed abundant evidence of the plundering which had produced these papyri, and it yielded far less to the explorers this winter than Bacchis; but from its tomb came rather unexpectedly certain large fragments, found lying loose in the sand, of which one is in Latin, the rarest of all scripts on papyrus, and three contain portions of Greek literary prose texts, not yet identified with any known author. Furthermore, there were many scraps of Homer, and such were found also at Bacchis, but these last were exceptions to the rule of non-literary documents prevailing on that site. By way of compensation, however, the diggers of Kûm el Qatl were rewarded with two fragments of peculiar importance. The first contains a large part of a rescript of an emperor, probably Commodus, addressed apparently to all provinces and cities of his empire. This text is beautifully penned by a local scribe with very deficient knowledge of Greek orthography. The second (also second century) purports to be a letter written by the Emperor Hadrian to a friend on the subject of his own approaching death. The fragment seems to be a schoolboy's copy of some once well-known text. Palæographers, rather than the general public, will welcome the intelligence that a great many documents and fragments of documents have been found, dated to the first century B. C., a period of which hardly any papyri exist. The most part were found in a chamber of the temple of the local god of Bacchis, discovered and dug out this year, and among them are two little complete petitions addressed to the god, whereof one seems to contain the prayer of some love-lorn maiden fearful that her beloved one may slip through her hands and depart from the city. Less pleasing, but always of great interest to the student of ancient life, are the mass of legal documents, memoranda, letters and the like which these two towns have yielded. So many were found in one spot at Kûm el Qatl that it appears probable that the situation of the local record office, or at least of the outpourings of its official waste-paper baskets, was chanced upon. — *London Times.*

SOCIETIES

BALTIMORE ARCHITECTURAL CLUB.

THE Baltimore Architectural Club proposes to give its first annual exhibition of architecture and the allied arts at the Peabody Institute, Baltimore, from November 1st to November 30th, inclusive. Drawings to be in on or before October 25, 1896.

WM. M. ELLICOTT, JR., *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE GUARANTY BUILDING, BUFFALO, N. Y. MESSRS. ADLER & SULLIVAN, ARCHITECTS, CHICAGO, ILL.

[Gelatine Print, issued with the International and Imperial Editions only.]

ALTHOUGH this building was put through its preparatory stages before the dissolution of the partnership between Messrs. Adler and Sullivan, the building itself has been erected as well as designed by Mr. Sullivan.

FACADE OF THE CITY-HALL, NEW ORLEANS, LA. MR. J. GALLIER, ARCHITECT.

THIS building has been measured and drawn by the pupils of the class in Architectural Engineering at Tulane University.

OLD HOUSES ON ST. THOMAS'S CHURCHYARD, SALISBURY, ENG.

THE DEANERY, CATHEDRAL CLOSE, SALISBURY, ENG.

SEE article elsewhere in this issue.

INTERIOR OF CHARTRES CATHEDRAL.

FEMALE ASYLUM, TEWKSBURY, MASS. MR. J. A. FOX, ARCHITECT, BOSTON, MASS.

SHELTER AND DUCK HOUSE, BACK BAY FENS, BOSTON, MASS. MR. E. M. WHEELWRIGHT, CITY ARCHITECT, BOSTON, MASS.

ALBION HOTEL, CHAMBLY, P. Q. MESSRS. BROWN, MCVICAR & HERIOT, ARCHITECTS, MONTREAL, P. Q.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXI: GARDEN OF THE VILLA CASTELLO, NEAR FLORENCE.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXII: MENAGGIO, ON LAKE COMO, FROM THE VILLA MELZI.

INTERIOR DECORATIONS.

STAIR-RAILS.

[Additional Illustrations in the International Edition.]

ELEVATOR SCREEN: GUARANTY BUILDING, BUFFALO, N. Y. MESSRS. ADLER & SULLIVAN, ARCHITECTS, CHICAGO, ILL.

[Gelatine Print.]

"THE VISITATION": GROUP AT THE MAIN DOORWAY OF THE CATHEDRAL OF RHEIMS, FRANCE.

[Copper-plate Etching.]

ENTRANCE HALL: BROOK HALL, NEAR CHESTER, ENG.

NOTES AND CLIPPINGS

MOSAIC DISCOVERED AT MELOS. — In the course of further excavations in the Island of Melos by the director and students of the British School at Athens, one of the most important discoveries has been that of a mosaic which is believed to be the finest yet found in Greece. It seems originally to have been about forty metres long and to have consisted of five panels, three of which are ornamented with geometric

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patterns, and the other two with figure subjects, very beautiful both in design and color. On one of them are represented two vines with leaves and grapes, among which birds and animals are grouped, the other panel, with a circular design, consisting of a series of different fish, while each of the angles holds a tragic mask, very finely treated. The finer details of color are represented with glass tesseræ, while portions of the black are laid in gleaming obsidian, so that the whole has a most brilliant effect. More recently the excavators have come upon a series of graves of the sixth century, B. C., in one of which were found a number of ornaments in gold and silver. In another (Roman) tomb were found a series of gold leaves from a wreath and a gold ring with a fine subject in cameo. The excavations are now being closed for the season, and Mr. Cecil Smith, the director of the school, is shortly expected in England, when further details will be published. The annual meeting of the subscribers to the school will be held about the middle of July, when Mr. John Morley has consented to preside. — *London Times.*

On the Dome of St. Peter's. — The strangest, most extravagant, most incomprehensible, most disturbing sight of all is to be seen from the upper gallery in the cupola looking down to the church below. Hanging in mid-air, with nothing under one's feet, one sees the church projected in perspective within a huge circle. It is as though one saw it upside down and inside out. Few men could bear to stand there without that bit of iron railing between them and the hideous fall, and the inevitable slight dizziness which the strongest head feels may make one doubt for a moment whether what is really the floor below may not be in reality a ceiling above, and whether one's sense of gravitation be not inverted in an extraordinary dream. At that distance human beings look no bigger than flies, and the canopy of the high altar might be an ordinary table. And thence, climbing up between the double domes, one may emerge from the almost terrible perspective to the open air, and suddenly see all Rome at one's feet, and all the Roman mountains stretched out to south and east, in perfect grace of restful outline, shoulder to shoulder, like shadowy women lying side by side and holding hands. And the broken symmetry of streets and squares ranges below, cut by the winding ribbon of the yellow Tiber; to the right, the low Aventine, with the dark cypresses of the Protestant cemetery beyond, and the Palatine, crested with trees and ruins; the Pincian on the left, with its high gardens, and the mass of foliage of the Villa Medici behind it; the lofty tower of the Capitol in the midst of the city; and the sun clasping all to its heart of gold, the just and the unjust, the new and the old alike, past and present, youth, age and decay — generous as only the sun can be in this sordid and miserly world, where bread is but another name for blood, and a rood of growing corn means a pound of human flesh. The sun is the only good thing in nature that always gives itself to man for nothing but the mere trouble of sitting in the sunshine, and Rome without sunlight is a very grim and gloomy town to-day. It is worth the effort of climbing so high. Four hundred feet in the air, you look down on what ruled half the world by force for ages, and on what rules the other half to-day by faith — the greatest centre of conquest and of discord and of religion which the world has ever seen. A thousand volumes have been written about it by a thousand wise men. A word will tell what it has been — the heart of the world. Hither was drawn the world's blood by all the roads that lead to Rome, and hence it was forced out again along the mighty arteries of the Cæsars' roads to be spilled in the Cæsars' battles — to redden the world with the Roman name. Blood, blood and more blood — that was the history of old Rome — the blood of brothers, the blood of foes, the blood of martyrs without end. It flowed and ebbed in varying tide at the will of the just and the unjust, but there was always more to shed, and there were always more hands to shed it. And so it may be again hereafter; for the name of Rome has a heart-stirring ring, and there has always been as much blood spilled for the names of things as for the things themselves. — *Marion Crawford in the Century.*

MacMonnies and the West Point Monument. — The figure of "Fame," modelled by Frederick MacMonnies for the Battle Monument, at West Point, is the occasion of a mild commotion in the artistic camp. The great shaft of the monument was erected on Trophy Point in memory of the officers and enlisted men of the United States regular army, who were killed or died of wounds received in action during the Civil War. The idea of erecting a battle monument at West Point was first conceived by Major C. H. Hasbrouck, now of the Fourth Artillery, when he was a young lieutenant, in 1864. Every officer in the service contributed a sixth of his pay for one month to the committee that had been appointed at West Point, and at the end of the month $50,000 had been raised. It was nearly thirty years later when the first stone was laid. In designing the monument the architects were careful to make it purely martial in character and impressive in form. Grace and beauty of outline in absolute harmony with the surroundings were kept in view. Bulky or massive treatment was put aside, and a monolithic shaft of splendid proportions rises to almost a height of eighty feet above the many trophies gathered on the spot. The base of the monument is circular. Granite steps lead up to it. Huge polished spheres of the same material rest on cannon at appropriate intervals. These cannon are set on square blocks of granite, weighing several tons each. The figure which is to surmount the whole is supposed to be the crowning glory of the monument. It is this figure, soon to be unveiled, that has caused the trouble. Frederick MacMonnies was selected to make it. Its name was to be "Fame." When the committee who had the matter in charge viewed the figure, after it had arrived from France, there was considerable dissatisfaction expressed, but after a consultation with the architects, the figure was placed on its lofty pedestal on the site of old Fort Shelbourne. A date had been set for the unveiling ceremonies, but the officers found fault with "Fame" and the date was postponed. The gentlemen in charge of the matter declared that the figure had not been designed for so lofty a pedestal. However, a meeting of the committee was called, the architects and MacMonnies were invited to be present. "Fame" was formally pronounced a failure, and MacMonnies received an order for a figure of "Victory." This displacement of one of the finest statues ever constructed by Mr. MacMonnies has caused much public comment. When the figure of "Fame" was first placed on the Battle Monument at West Point, it received most favorable comment from every direction. It was reproduced, by request, in three-foot bronze statuettes, and these have been scattered throughout the country in schools and other public buildings. Leading artists have declared that Mr. MacMonnies's conception of "Fame" was most forcible, and suggestive in every way of dauntlessness. The statue of "Victory," which will soon be erected in its place, though dignified and poetical, does not seem, to many sculptors, to lend the same inspiration or suggest the same force as the figure it replaces. All attempts to get a statement from the architects as to why the first figure was displaced have been unsuccessful, and artists are puzzled to know the motives behind the change. Probably the only approach to motive in the matter is military ignorance of the fine arts. — *The Collector.*

The Canal Lock at Bremerhaven. — Next fall the new imperial harbor of Bremerhaven will be opened to the public, and a work will then have been completed which must be counted among the most important of its kind. The new harbor has been in course of construction since 1892. It will be protected from all sides by very strong levees against the frequent high flood-tides of the North Sea, and will contain three large basins, which will be open during ordinary high tides, while at ebb-tide the entire complex of basins and passages will be closed off by gigantic locks. Since the dimensions of steamships are continually growing, and the largest steamers of the North German Lloyd must be able to enter the new harbor, the entry had to be made large enough for all. The former inner harbor at this point was greatly increased in size, and a new entrance was built, which comprises, besides a strongly-built dike over three-quarters of a mile long, the largest lock so far constructed. This lock will be kept closed whenever the water in the Weser River is lower than the depth of water to be mantained in the harbor. When open, the lock has a clear width of 91 feet, the gate being 38 feet high, the largest in the world. The length of the lock between the two gates is 700 feet, and at ordinary high tide there is a depth of water of 33 feet. The gates rest in two masonry structures built on caissons of 20 feet in height and solidly cemented to the ground. The building of these structures, which took place under very favorable conditions, has succeeded surprisingly well, considering that it is one of the most difficult technical problems. The entire construction rests upon pile work, the length of the piles varying from 50 to 70 feet. Most of the construction work was carried on during the ebb-tide, recurring twice every twenty-four hours, so that only four hours a day could be employed at that work, and that only in favorable weather. What an immense amount of work was necessary to construct this harbor is evident from the following figures: Twenty thousand piles were sunk for a foundation, 45,000,000 cubic feet of soil had to be taken away on dry ground, and as much more dredged out by the immense dredges formerly used in the construction of the North Sea Baltic Canal. At the entrance of the harbor 4,750,000 cubic feet of masonry work were necessary to strengthen the dikes and hold the colossal locks. An immense dry-dock has been built immediately adjoining the harbor, which will accommodate the largest vessels of the world, its dimensions being identical with that of the lock at the entrance of the harbor. — *St. Louis Globe-Democrat.*

A Colossal Copper-plated Statue. — A colossal statue of St. Fidelio has recently been erected upon the People's Tower at Palazzolo, a small city between Brescia and Bergamo, in Lombardy. While the statue measures not less than 24 feet in height, its weight is only 1,760 pounds. Had it been cast in bronze this statue could not have weighed less than 50 tons. This fact is of the greatest importance, since the statue is erected upon the top of the dome of the great tower, at a height of 350 feet above ground. The statue is made of galvanized-copper, and has shown what artists and architects can do with an intelligent employment of electro-plating. The statue was modelled in clay by the sculptor Antonio Ricco. The shaping of the galvanized-copper plates took place in the electro-plating establishment of Count Vittorio Turati, in Milan. The work of the sculptor was first modelled in plaster, full size, the mold being then divided into 17 parts. Each of the pieces was then covered with a layer of plumbago and placed successively into the galvanic bath. To facilitate the deposit of copper upon the plaster a net of metallic wire, shaped to the form of the surface to be reproduced, was placed quite close to the form itself, and a number of small pins or pegs kept it at even distance from the plaster form. The bath consisted of a solution with a base of sulphate of copper. Once the first layer of copper was deposited upon the mold, the metallic net was taken away. In a few of the more delicate parts, however, the wire net was allowed to remain, and was thus entirely covered by galvanic-copper, so that it remained a sort of strengthening armature to the piece itself. The duration of the plating process was from 10 to 12 days for each piece, and in some cases more; the intensity of the current was regulated in such a way as to obtain a metallic cover of great cohesion. The thickness of the metallic surface deposited is on the average four millimetres. The surface of the statue which had to be covered with copper is in the neighborhood of 400 square feet. The electric current necessary for the plating was generated by a dynamo of 600 ampères, at a tension of from four to six volts, and a four horse-power gas motor furnished the power. The cost of this work is considerably less than if it had been cast in bronze. The expense averaged from 8 to 10 lire per kilogramme (80 cents to $1 per pound), or about $1,600 for the entire statue. — *Philadelphia Record.*

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NOTES AND CLIPPINGS. 24

THE New York *Tribune* makes some excellent editorial remarks on the movement which, to a great extent through the unselfish efforts of Mr. Richard Watson Gilder, has attained such force in New York, for improving the condition of the dwellings of the very poor. The *Tribune* observes, with truth, that although the political conditions existing in this country are, as we believe, far more favorable for the welfare of the poorer class of citizens than those prevailing in Europe, the houses in which they are compelled to live, are, as a rule better in Europe than they are here. The main reason of this is that, although there, as here, a good deal has been done by private benevolence to provide decent and wholesome habitations for poor people, we have not yet come to a sufficiently keen appreciation of the menace which the worst sort of tenements offer to all the inhabitants of the city that suffers them to adopt the rigid police measures by which, in foreign cities, such buildings are supervised and regulated. By the well-directed zeal of Mr. Gilder and his associates a great reform has been initiated, in the passage of the so-called "Tenement-house Law," and the carrying-out of the law should enlist the sympathy of all good citizens. The cardinal principle of our political system assumes that every man is capable of thinking and acting for himself, and any movement, however well-intended, which involves the suggestion that any class of citizens is entitled to ride on the backs of other citizens or is under obligations to carry other citizens on its back, is, in the end, dangerous to liberty; but it is one thing to relieve a fellow-man from the necessity of walking, by carrying him in our arms, and another thing to clear away from his path obstacles which have not been placed there by his fault, and which his eyesight, less keen than our own, may not enable him to detect, or which his strength may be insufficient to remove. One of the most serious obstacles which a poor man in a great city finds in the way of maintaining his capacity to work, and in bringing up his children in decency and health, is the difficulty of finding a habitation, at a rent within his means, offering a reasonable amount of light and air, and freedom from noxious influences. If he could afford to choose his dwelling-place, he might be expected to assume the responsibility of choosing wisely; but a great number of people cannot choose, the lowest rents being the only ones that they can pay; and these people ought not, through their helplessness, to be exposed to material and moral contaminations, due to the neglect and selfishness of others. "Use your own in such a way as not to injure others" was the maxim, in regard to the management of property, of the greatest nation that ever existed, and the restraint of those to whose selfishness is due the existence of conditions which threaten the welfare of innocent people is a plain duty.

MR. A. J. BLOOR writes a timely letter to the *Tribune* on the subject of the recognition of architecture as a fine art by American artistic bodies, and particularly by the National Academy of Design. Notwithstanding the reputation of the National Academy of Design among the general public as a somewhat fossilized institution, it is certainly held in great respect by architects, as the principal representative in this country of the great artistic corporations in Europe, the Royal Academy of England, the Institute of France, and the various Italian and German bodies, which have been made illustrious for centuries by the reputation of their members, and the wisdom and dignity with which their affairs have been administered. Holding such a place, it has for years been a matter of wonder to the profession that the National Academy should not have provided for the admission of architects to membership, and we imagine that a good many people, outside the profession as well as within it, were not pleased, on the death of Mr. R. M. Hunt, at the reflection that an American who had been selected in England as the recipient of the Royal Gold Medal, and had been for years a member of the Institute of France, should never have had the smallest recognition from the principal artistic body of his own country.

OF course, the National Academy of Design understands its own affairs best, and is under no obligation to admit architects to membership if it does not want them, but if it prefers not to associate with them, there should be no delay in taking steps for the formation of a national body, devoted to the promotion of fine arts, which will provide a place for the most distinguished of the men who have done more to raise the artistic reputation of the United States, and to direct the attention of the American public to matters of art, than all other agencies put together. It is true that the Architectural League unites the various artistic professions in an admirable way; but the work of the League must necessarily be somewhat local, and membership in a body of earnest and active practitioners and students is a different thing from election, as the reward of conspicuous merit, into a circle composed of men whose career has already reached its zenith, and who choose a new companion, not on account of what he promises to do, but by reason of what he has already done. The objection is sure to be made to the establishment of bodies of this sort, as it has often been made to the proceedings of the National Academy, the Royal Academy and the Institute of France, that it creates a hierarchy, promotion in which is reached through favoritism, rather than through merit. No doubt there is some truth in this notion, for the members in control at any given period naturally select, for admission to their ranks, men who sympathize with their own view of artistic matters; but a good tradition, kept pure, is an excellent safeguard against temporary vagaries, and nowhere more so than in the affairs of art; while the advantages of some sort of hierarchical system of promotion, in developing and encouraging merit, far outweigh the evils of an occasional mistaken estimate of merit. It is a familiar principle that a few great professional prizes will encourage a whole profession to the industry and good conduct without which such prizes cannot be hoped for; and the profession of architecture is now so large that such prizes can be of much use to it in keeping it to a standard of conduct and accomplishment. For this purpose, nothing at present available would be more effective than the prospect of membership in a body composed of the very elect of the artistic world, and there is no reason why America should not offer to its artists such an object of emulation.

A CELTIC builder has got himself into trouble in Massachusetts, by forgetting temporarily, as it appears, what country he lived in. It seems that he is the contractor for a public school building in the city of Lawrence, and, on the Fourth of July, took it into his head to decorate the unfinished structure with the flags of Ireland and the United States, hung side by side. Now there is a statute in Massachusetts, which says that "it shall be unlawful to display the

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flag or emblem of any foreign country upon the outside of any state, county, city or town building or public school-house within this Commonwealth, provided, however, that when any foreigner shall become the guest of the United States or of this Commonwealth, upon proclamation of the Governor the flag of the country of which such public guest shall be a citizen may be displayed upon public buildings, but not upon public school-houses"; and the contractor was, in accordance with this statute, duly summoned to answer for the misdemeanor, to which a fine of not more than twenty dollars is attached. Before the fine can be imposed, however, some knotty legal questions must be answered, and the inhabitants of Lawrence are awaiting the trial of the case with some curiosity. The principal question is, of course, whether an unfinished school-house is a public school-house, within the meaning of the statute, or not. The city of Lawrence has paid for the land on which the building stands, but has not completed payment for the building, nor has the structure been turned over to the city authorities. Unless there are some precedents applicable to the case, the question offers possibilities of argument on both sides which should highly commend it to law-schools and debating-societies, but it remains to be seen whether the contractor will have the question fought out at his expense, or will choose the cheaper, if less noble course, of pleading guilty and paying his fine.

THE Executive Committee of the National Association of Builders gives notice of the Tenth Annual Convention, which is to be held in Buffalo, beginning on Tuesday, September 15, and calls attention to the importance of urging all builders, so far as possible, to be represented in the Convention. The Committee points out, with much force, that labor is constantly becoming better organized, and that, relying on its organization, it now appeals to Legislatures to procure for it by statute the advantages which it has hitherto struggled for by means of strikes. Against the influence brought to bear on law-making bodies by the powerful trades-unions individual builders have practically nothing that they can oppose; their only chance of protection against legislation by which they may be seriously injured lies in united action. Of course, the best way to secure the advantages of this united action is to join the influential body already existing, and the Committee thinks that, for the good of all, the next Convention should be mainly devoted to the discussion of the reasons for and against the association of builders.

AS an example of the way in which the unions in the building trades, which are now very generally bound, by annual agreements with the master-builders, not to strike, pursue their object of compelling men to join them, by preventing them, if they do not, from obtaining employment, it is interesting to learn that a committee of the Massachusetts Building Trades Council was recently appointed "to secure the employment of union men on all structures being erected by the Catholic Church in Boston and its vicinity," which seems to have met with considerable success in its efforts; while a hearing has been granted to the same body by the Mayor of Boston, relative to its request that none but union men shall be employed on buildings erected or repaired for the city. The agreement in force between the Boston unions and the master-builders provides, we believe, that the latter shall employ union or non-union men, without discrimination in favor of either, and the plan of evading this agreement by appealing to the two principal real-estate owners to exclude non-union men from employment on their buildings is characteristic of union management.

THE *Engineering Record* prints some interesting letters on garbage cremation in Germany, communicated by Mr. Rudolph Hering. It seems that, in Europe, the reduction processes, in which the grease and valuable fertilizing materials are separated and saved, are not in favor, owing to what is considered there the excessive cost of the processes concerned; and the incineration of the garbage is preferred. Considering that in most of the large cities in Europe ashes are mixed with the kitchen refuse, it is not surprising that the chemical treatment of the mixture should be a costly matter, but it certainly seems a matter of regret that so much valuable fertilizing material should be wasted. Taking things as they are, however, the cremation of the mixture of ashes and garbage is greatly facilitated by the unburnt coal contained in the ashes. In England, the half-burnt coal is said to amount to about twenty-nine per cent of the whole mass of refuse, and it is hardly surprising that this serves, not only to dry and burn the garbage, but to furnish enough surplus heat, in some cases, to generate steam for driving electric-lighting or pumping engines. In Germany, the coal consumed in households is much better utilized, and less than two per cent of the waste is available in the shape of coal. The German garbage contains, however, a large proportion of paper, rags and wood chips, which are combustible, so that, in Hamburg, no extraneous fuel is used for consuming the garbage, and in Berlin it is only necessary to employ such fuel in winter, when the house refuse contains, besides ashes, a good deal of sand. The incineration, in the Hamburg and Berlin furnaces, is completely carried out, so that nothing remains but inorganic matter. Although this matter probably contains a certain amount of phosphate and alkali, no one has been found willing to assume the cost of carrying it away, for the sake of the valuable materials in it, and the expense of removing the ash forms a considerable portion of the cost of maintaining the plant.

WHETHER our people would be willing to give up the practice of collecting kitchen refuse separately from ashes it would be difficult to say. The separate system is certainly regarded here as cleaner, and, where the ashes alone are used for filling, as is often the case, there is an economy in carting them directly to the place where they are to be used, instead of taking them to the crematory, to be uselessly heated, and then reloaded into carts and carried away again. As the kitchen refuse by itself contains, however, nearly ninety per cent of water, there are obvious difficulties in the way of burning it directly without extraneous fuel. It has been proposed to treat it in much the same manner that bricks are burned in a Hoffman kiln, by means of an elliptical ring of ovens, drying the fresh material by successive stages by means of the waste heat from the calcining oven, the fire being shifted continuously from one oven to the next, so that there are at all times one or more ovens at the maximum heat, one or more cool ones, ready to receive fresh garbage, and several intermediate ones varying in degree of heat with their distance from the burning oven, in which the garbage is dried and brought to a condition suitable for combustion. Theoretically, with a series of ovens arranged in this way, the burning of the combustible portion, even of wet garbage, should be amply sufficient to evaporate the water, and bring the material into a condition suitable for burning; but, so far as we know, the idea has not yet been put in practice.

PROFESSOR GOODYEAR'S collection of photographs, showing the intentional deviations from symmetry practised by the Byzantine and early Gothic architects in Italy, has been placed on exhibition at the Brooklyn Institute of Arts and Sciences, and should certainly be visited by every architect who can find opportunity for doing so. The means by which the photographs are made to show the irregularities of plan and construction in their subjects are as ingenious and simple as they are effective. To show the intentional curves, both in horizontal and vertical planes, of the principal string-courses in, for example, the Cathedral of Trani, the camera is set close to the line of the string-course, just as a carpenter would look along the edge of a board to see if it be straight. Of course, in this way every deviation from a straight line is clearly visible, and the photograph, which takes in the bases of the upper columns, and the upper part of the nave arches, shows relations which could hardly be noticed in a mere diagram. In a similarly simple way, the curious outward bends of piers and columns are shown by suspending a plumb-line by their side, and photographing both together. In the Cathedral of Pisa, the effect obtained in this way is that of a reversed curve, carrying the lines of the main arches down to the pavement; but, as in the case of the profiles of Grecian buildings, the curvature is so subtile as to show itself, under ordinary circumstances, only by the unaccountable softness and sentiment of the interior. It is hardly necessary to say that one does not get a camera into position for sighting along a string-course, fifty feet above the pavement, without a good deal of gymnastic exercise, and Professor Goodyear and his skilful assistants have shown a devotion to their interesting and important work which cannot be too warmly commended.

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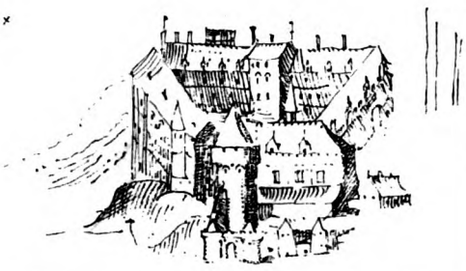
THE CHATEAU DE BLOIS. — I.

THE WING OF FRANCOIS I.

TO all students of the history of architecture or to those imbued with feeling for the romantic associations that cluster around the buildings of mediæval France, the Château de Blois is of great interest.

Originally the ancient fortress of *pagus Blesensus*, through various transformations it became in the fifteenth and sixteenth centuries a favorite residence of the Kings of France, who lavished here all that was best in the art of their respective epochs.





The palace occupies but a small portion of the fortress or *château fort*, the ancient walls of which stretch irregularly around the summit of a lofty promontory that overlooks the City of Blois and is the highest elevation in that portion of the valley of the Loire.

As early as the time of the Merovingians a well-defined fortress is known to have existed and the name *Bleso castro* appearing on coins of that period proves it to have been a place of considerable importance. The Merovingians were not a race of builders, rarely erecting new works, utilizing, instead, the buildings of their predecessors: so from this reason, one is safe in assigning a Roman origin to the Château now standing.

The site of a Roman camp was usually selected at the juncture of two rivers, the banks of which were easily defended; while the weakest point, the base of the triangle thus formed, was protected by the strongest works, an essential feature of which was the deep moat or *fossé*.

Blois, situated at the confluence of the Loire and a tributary, the Aron, was at the time of the Romans a place of considerable importance, several ancient roads here crossing the river which formed a natural boundary between two ancient provinces. Such a strategic point the Romans would not have left unfortified, though few remains are left to attest the real importance of their work. The high precipitous banks of this promontory were a natural defence, while the dry moat, to-day a veritable ravine, was defended by the strongest works.

After many changes and rebuildings necessitated by the advance in military science, the centralization of power led to the abandoning of the *château fort* and, gradually transformed into the palace, Blois finally lost all martial aspect. Henceforth its history is that of a dwelling, refuge and prison: the retreat of Charles VII; the birthplace of Louis XII and favorite residence of Claude of Lorraine, his daughter, for whom her husband, François I, doubtless undertook those alterations that have so identified the Château with his name.

Henri II, caprice led, found here, surrounded by a gay court, refuge from the turmoil of his angry cities. During the religious wars of François II and Charles IX political questions often led them to a residence here and Henri III, the last royal occupant, found at Blois greater security than at Paris. Marie de' Medici was here imprisoned and from the north façade made her romantic escape. At last, losing royal favor, it was given to Gaston, Duke of Orléans — a bribe for his submission to Richelieu — together with the duchies of Orléans and Chartres. After his death the Château was practically abandoned and Louis XVI granted to several ancient families the privilege of occupancy, which they retained until the Revolution.

Suffering at that time the mutilation common to all buildings that bore any emblem of royalty, it became a barrack of the Revolutionists and endured changes and depredations at the hands of a loose and lawless soldiery.

In 1841, with the good taste that so distinguishes the modern French, the restoration of the Château was undertaken by the Société des Monuments Historiques and the work intrusted to Duban. Four hundred thousand francs were raised, and later an annual appropriation made, with which funds the first restorations were begun.

The subsequent decay of the material then used necessitates continual repair and the present explorations of the many remains of the ancient fortress demand the services of a resident architect (M. Grenouille) and a corps of workmen.

This brief glance into the history of the château shows how closely it is connected with the history of France itself, and no single edifice is more indicative of the civilization and society of each epoch moulding it than this regal palace, seated on its grim foundations of Roman *castrum* and Mediæval fortress.

What clouds of traditions, true and fabulous, cluster around this romantic pile! How many songs and romances of love, of war, of chivalry are written here! Its floors have been stained with blood of a mighty prince and its walls bear many inscriptions in Gothic and Roman letters, carved by idle hands.

On the terrace Charles d'Orléans wrote his famous rondel:

> *"Le temps a laissié son manteau,*
> *"De vent de froidure et de pluye."*

and, engraven with bodkin or stilleto, tributes of love and complaints of ennui are found on walls of guard-room, gallery and staircase.

Some weary sentinel has with greatest pains and care, proof in itself of his plaint, engraven:

> "EN VIE
> "M'ENNVIE
> "ET NE PUIS IOVIR DE MA MIE
> "LA BRVIERE" —

while a faithful sentinel hands down to all ages his trust:

> "CY SVIS QUI SVIS
> "BON HOMME SVIS
> "ET SVIS COMMIS
> "A GARDER L'HVIS
> "JE LE GARDERAI SI LE PUIS."

A modern truth has found a recorder in those days:

"FAULTE D'ARGENT EST DOULEM GRÄDE."

To the casual visitor the Château appears raw and cold with all the freshness of restoration, and little romance can one find in the studied tales of the concierge, who has little thought save of the expected fee. But, once visit the court-yard in the evening, when the fading light has softened the marks of the restorer's chisel, or at night in the full moonlight when the façade of François I seems a work of enchantment; wander some rainy day among the vaulted rooms of the lower stories or along the roof gallery, with no sound to break the silence save the melancholy drip from the gargoyle or the distant sound of workman's hammer, and all the romance in one's nature surges up and little effort does imagination require to re-people the Château; to see that "*roi chevalier*" enter, surrounded by his Scottish guards, whose very names some idler of them has engraven on the balcony on which we stand. One shudders, too, in passing the New Gallery to recall the gallant fight for life of the Duc de Guise, who, single-handed, his sword entangled in his cloak, fought six armed men with a silver candy-box till, stabbed in the back, he fell a victim to the hatred of his master.

Judge of the interest of the three months' residence granted the writer in this Château among such surroundings, and if the following observations and accompanying drawings made during this sojourn add but little to all that is known of this building, the pleasure of the task alone is a reward.

The approach to the Château is usually made from the north where, at the foot of the façade on this side a series of terraces lead, through a breach in the ancient fortress wall, to the Place du Château.

As one ascends, the façade above seems literally to spring from the living rock.

Resting on the gray foundations of the old fortress, its legacy from the Middle Ages, its walls broken by the many-colored loggias and projecting oriels; crowned by the deep-shadowed roof gallery with the broad expanse of dark slate roof rising above, the building, in composition and in details, is as full of charm and romance as the cloud of association and tradition surrounding it. To the right, the façade is terminated by the picturesque tower now half-concealed by the more severe work of Mansard. To the left, the irregular projections of the courses and unfinished portions of the loggias indicate the incompleteness of the design.

This façade, the exterior of the wing of François I, can only be thoroughly understood after a detailed consideration of the plan; so,

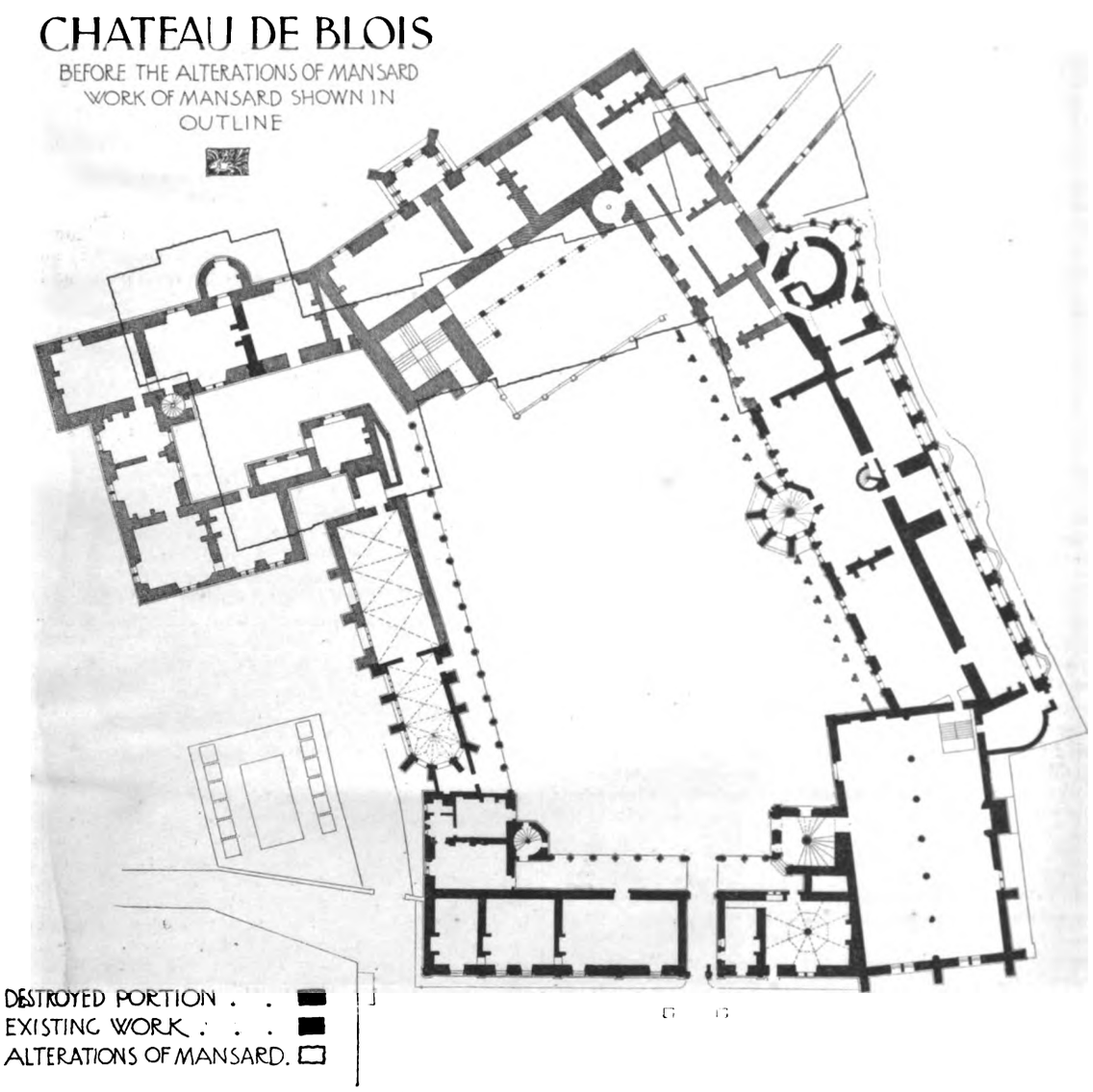
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hastening to the Place above, let us leave until later a more critical examination. One passes at the foot of the Salle des États, the grand hall of the Château, through the breach, the sides of which show a wall of a defensive character.

Here, formerly, stood a large entrance arch, unfinished, of the period of Henri II, but happily destroyed by the restorer in order to free this end of the Salle des États from all incumbrances.

We now reach the Place and stand within the walls of the ancient fortress, the towers of which can readily be traced among the modern buildings surrounding us. This was the outer court of the *château fort* and probably was devoted to the residence of the garrison. The centre, however, was once occupied by a large church, Saint Sauveur, demolished during the Revolution, of which no trace has been left us save in the two sketches here shown and descriptions in various chronicles.

The façade of Louis XII, facing us, is an innovation on the original fortress plan, a wing dividing the court-yard in two. The smaller court, the existing one which we enter through a vaulted



gallery, is surrounded by buildings of three different periods of French art and records the best efforts of the artists of each epoch. To the right, the wing of François I; in front, an intrusion, the wing of Gaston d'Orléans; to the left and behind us, the Gothic buildings of Louis XII and the earlier one of Charles d'Orléans.

The most noticeable features of the court-yard are the staircase cages of François I and Louis XII, all that remain of a symmetrical grouping of towers, a chance one perhaps, destroyed by Gaston d'Orléans.

Once within the court-yard, in our exploration of the surrounding buildings, the plan of the ancient fortress can readily be examined and is of the greatest importance in having determined the disposition of the present buildings. Following the crest of the promontory the defensive works incrusted by the houses in the Place are readily traced, and the excessive thickness of certain walls in the existing buildings declare them defensive in character.

One free-standing tower, on a terrace back of the chapel, remains entact and owes its preservation to its strength and strategic importance, commanding the extremity of the moat. This tower, the Tour de Foix, is unaltered on the interior, the old vaulted rooms and loop-holes of the twelfth century remaining. On the summit a small building was erected in the seventeenth century together with a staircase giving access thereto. Tradition associates the name of Catherine de' Medici with the astrological observations for which this building was erected.

The Tour du Moulin, the tower commanding the opposite extremity of the ancient moat, has been incorporated in the façade to the north and surrounded with galleries by François I, retaining in the interior, however, the ancient rooms used then, as in the Renaissance, as prisons. The old moat between these two towers has been gradually deepened until it has become a small valley.

Within the wing of François I another tower is embedded in the north façade and its foundations are traceable on the exterior.

On the roof of this wing, the height of the old fortress wall is marked by the existing *chemin de ronde* of the Middle Ages. The old sketches show an approach from the town, the upper portion of which lands at the end of the wing of Louis XII, and, on the side of the moat, several towers that doubtless were alterations of defensive features by Charles d'Orléans. But Gaston d'Orléans obliterated all that remained and work is now in progress in the cellar and foundations of the present wing to verify the drawings of Du Cerceau who made very detailed sketches of this Château in 1579 — published in "*Les plus Excellents Bastiments de France.*" In its transition from fortress to dwelling the numerous alterations were gradual and doubtless began before the time of the accredited restorer, Charles d'Orléans.

The drawings left us in the book above mentioned show no trace of the fortress save in plan, and much of the work, judging from the remaining gallery, was constructed in brick.

Alterations were also made by Charles d'Orléans on the wing now known as that of François I, to which fact several Gothic mantels and the woodwork of the roof attest.

Louis XII, born here, reigned at Blois and enlarged the Château by constructing across the court from the Salle des États, the large hall, to the Chapel, the wing bearing his name, thus limiting the size of the court-yard. His work is so characteristic, one has little difficulty in identifying his alteration in the Salle des Etats itself and to the Chapel.

The plan of this wing is identical in character with that of Charles d'Orléans, viz., a series of rooms opening on an open arcade

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on the first floor and on a corridor above, with staircase towers at either end giving access to the various stories. François I altered the north wing, which had already been converted into a dwelling by Charles d'Orléans, building the staircase, possibly a new court-yard façade and a terrace between the Tour du Moulin, whose strategic importance led to its preservation, and a central tower.

Access to this terrace was gained by means of a staircase, still existing, and doubtless several balconies were built in the old fortress wall, now appearing as alcoves in the later wing.

Hardly had these alterations been completed when a greater one was begun. A new wall far richer than the one adjoining the grand staircase was continued to the Salle des États. This was undoubtedly built from the ground, as it is considerably thinner than the one of which it is a continuation.

A new series of rooms was constructed *outside* the old fortress wall, embracing the central tower of the old fortress wall and abutting the gallery around the Tour du Moulin, whose lines the new façade carried through.

This was at a later date continued along as far as the Salle des États where it remains to-day incomplete.

Thus it is seen there is a single wing, that of Louis XII, which was built anew and the work of the early Renaissance, but with a series of alterations made at different times by different workmen, the old work influencing the new in every way.

The result is full of charm, but no more inconvenient arrangement of rooms for a palace could, according to modern lights, be devised.

The grand staircase has really a double function of corridor and staircase and no access can be gained to the King's Chamber save through all the other rooms, which proved convenient on a single occasion only — the assassination of the Duc de Guise.

Throughout this wing, the feudal fortress and Gothic alteration appear with more or less distinctness as on some old parchment the previous writings, half obliterated, appear beneath the later text.

W. T. PARTRIDGE.

[To be continued.]

THE ART OF BRONZE CASTING IN EUROPE.[1] — I.

ABOUT ten years ago it was my privilege to deliver an address in this room on "Artistic Bronze Casting," and when I received the invitation of your Society to read another paper on the same subject, I confess that my first impulse was to avoid the task. I was afraid that I should, of necessity, go over much of the same ground that I had traversed on the former occasion, and only weary you by repetition. Besides this, I had fresh in my memory that admirable paper on "Japanese Bronze Casting," delivered some twelve months ago, when Mr. Gowland treated the whole practice and theory of bronze casting in so complete a manner that it seemed superfluous for any one to say more on the subject, unless he could show some entirely new process, or point out some hitherto unknown principle of the art.

Now, I confess, I have no such discovery to boast of, and yet I am here. I remembered that the historic side of the question had not been touched on in my former paper, which was almost, if not entirely, confined to the technical difficulties which this art presents. I propose, therefore, to treat the technical part as concisely as may be consistent with lucidity, and I do this with an easy conscience, as many of you are familiar with the process, and there are now several bronze foundries in England where excellent work is carried out on the waste-wax system.

When Mr. Alfred Gilbert, Mr. Onslow Ford and myself first began to agitate for the introduction of waste-wax bronze casting in this country, there was scarcely any one in England besides ourselves who had any knowledge of the subject; nor was there any foundry on this side of the Alps where waste-wax casting was practised or understood. For years we were unable to awaken any interest in the subject, but at last I was asked by the editor of the *English Illustrated Magazine* to write an article on bronze casting, which was published in 1883. This was followed, curiously enough, for there was no pre-arrangement, on the very next day by a most interesting lecture at the Royal Academy by the late Sir Edgar Boehm, assisted by Mr. Alfred Gilbert.

In 1884, further interest in the subject was aroused by the very able and interesting report of Sir Savile Lumley to Earl Granville on bronze casting in Belgium, where the waste-wax process had just been experimentally introduced by the Société Anonyme des Bronzes, at Brussels. In Paris also, M. Gonnon had produced more than one work by the wax process, although it was stated, I do not know with how much truth, that these were only partial successes, having need of very considerable repairs and chasing before leaving the foundry.

From that time to this the interest in this process has gone on increasing; and there is now no difficulty in getting bronzes cast by the wax process in England. This, and the advance in sculpture that has taken place in the public estimation during the last twenty years, must be my excuse for again addressing you on the same subject.

As to the antiquity of bronze casting in Europe, we only know that it dates from prehistoric times, and that it is impossible to say how or where it originated, or to give to any individual the credit of its invention. Sir J. Savile Lumley says that according to several Danish and German writers, the European bronze of prehistoric ages was probably an indigenous industry, not of Phœnician origin, but originally discovered in Britain. I am content to accept this theory as being quite as worthy of belief as the legend for which Pliny is responsible, that the art of bronze casting was invented by Scytes the Lydian, or Theophrastus the Phrygian.

The Palafites, or lake-dwellings of Savoy and Switzerland have yielded a very considerable harvest of early European bronzes, and also, in some instances, they have preserved some record of the manner in which these were produced. At Thonon, Switzerland, a mould for a spear-head was found which was composed of two slabs of stone, on each of which a spear-head was cut out to a proper depth. The two stones, being placed face to face, and bound together, would form a very simple but effective close mould from which many casts could be taken, without any injury to the mould itself. It is this mould of which Sir J. S. Lumley says that a modern lance-head was produced from a prehistoric mould. It was probably the earliest known example of piece-moulding amongst European bronze founders.

All their works, however, were not produced by piece-moulding, since another mould was found, made of clay over a wooden pattern, which seems to have been burned out, leaving a cavity to receive the molten bronze. In this, then, we find the first principle of the wax process, namely, the destruction or "wasting" of the pattern by fire.

This earliest process, which we may term a waste-wood process, would be only applicable to simple forms on account of the difficulty of completely destroying the wooden pattern, and afterwards getting rid of the ashes from the cavity of the mould; but it was a great discovery, and doubtless the genius who invented it would not be long in discovering that other substances more easily wasted by fire, such as wax, were capable of being fashioned into various shapes, and of being advantageously used as patterns for bronze casting; and there is every reason to suppose that the more important works found amongst the lake-dwellings of Lake Bourget were cast by the very waste-wax process which we have been trying to revive in England for the highest class of bronze statuary.

In the opinion of Count Casta de Beauregard, whose discoveries in Lake Bourget have so greatly enriched the museums of Aix and Chambéry, these settlements were destroyed by a race of men of the iron age, who carried fire and sword through the district long before the Roman era. Be this as it may, there can be no doubt as to the great antiquity and artistic value of the wax process, and moreover, as the ancient European nations do not seem to have been in the habit of making piece-moulds, except of the most simple description, namely, in two halves, it is not easy to see how else they could have executed large or complicated works. It is true that clay figures of the Tanagra type were got from moulds which were made, as I believe, in two halves, and some of these figures seem to be of a complicated character. Yet the heads and arms seem to have been moulded separately, and the undercutting in folds of drapery, etc., to have been omitted. Each of these figures, therefore, would consist of the following separate simple piece-moulds: — First, the body or trunk of the figure; second, the head; third and fourth, the arms; four moulds in all. After the soft clay had been squeezed into these moulds it was an easy matter to join heads and arms to the trunk of the figure and to retouch the whole, which was then allowed to dry, after which it was fired in a kiln and became terra-cotta. This principle of dividing the figure into several parts to be afterwards joined up to form a complete whole was a great discovery in the art of the moulder.

Of all the European nations of remote antiquity the Etruscans and Greeks stand forth pre-eminent as artists, and when we think of antique sculpture, whether in marble or bronze, it is Greek sculpture that is always in the foreground of our thoughts. And it would be strange if this were not the case, since we possess in our museums so large an amount of works, which although they are chiefly rather from Rome than from Greece, yet the Roman sculpture being greatly an echo of the earlier Greek art, was inspired by Greek legends and traditions, and executed, almost without exception, by the hands of Greek artists often brought as slaves from Greece to Rome, and employed by their conquerors to reproduce the originals they had brought to Rome as the spoils of war.

In ancient Greece the art of the statuary in bronze was held in high estimation; the desire of possessing bronze statues of divinities, heroes and statesmen seems to have been insatiable, and there were more bronze statues than we modern sculptors can conceive of.

It is then of Greek bronze casting that I propose to speak first. According to some old author — Pausanias, I believe — the art of modelling the figure, and of casting it in bronze, was first practised at Samos about 700 B. C. Many writers on art have put forward various theories as to how the old bronze statues were produced, and as many of these writers knew nothing about bronze casting, their ideas were often somewhat absurd.

Winckelmann, for instance, states that the horses of St. Mark's, at Venice — of which there are four — were all cast out of two moulds, not knowing that the mould is destroyed every time a bronze casting is made. Lemot, the French sculptor, who made some repairs to these horses, when they were taken to Paris by order of Napoleon the First, had ample opportunity of examining them, and

[1] A paper read before the Society of Arts by Mr. George Simonds and published in the *Journal* of the Society.

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found that their heads and necks were cast separately, and that collars had been added afterwards to conceal the joints. This is not surprising. It is very doubtful if the Greeks or Romans ever attempted to make castings of the dimensions that we find to have been successfully carried out in later ages. It is pretty certain, I think, that they cut up their larger works, and cast them in parts, which were afterwards fitted together on much the same system as the terra-cotta figures were produced in clay. There is much to be said in favor of this system for large work, and little to be said against it. I will try briefly to tell you what, in my opinion, are the advantages and disadvantages.

A bronze casting, unless it be of very small size indeed, is always cast hollow, and, in order that it may be so cast, it is requisite that it should have a core inside as well as a mould outside it.

Now it is clear that if an object like a horse is to be cast, with a core inside, and if it is to be cast all in one piece, then that core will have to stay inside, since there will be no opening whereby it can be removed. Now the great weight of the core inside is a considerable disadvantage in erecting or moving a statue, and puts an unnecessary strain on the legs, which have quite enough to support without it. Moreover, the material of which cores are composed is excessively porous, taking up moisture greedily from the air, so that it is a source of danger to the thin bronze statue, which is certain not to be absolutely air and damp proof. There will be here and there some tiny fault, through which the core will absorb, and at last become so moist, that a severe frost might swell it almost to bursting. If the horse is cast without his head and neck, the core is easily removed and these dangers avoided.

There is, however, a more weighty reason for casting a horse without his neck and head. When the bronze is poured into a hollow mould it is at a temperature of, roughly speaking, 1,900°, consequently the air in the mould is expanded so suddenly that, unless escape were provided for it, an explosion would be the result; but although the main body of air escapes through the vents, there seems to be a film of air remaining, which, I imagine, prevents actual contact between the walls of the mould and the metal, so long as the latter is in motion and the mould is not yet full. When the mould is full, the outward pressure of the fluid metal forces this film of air out through the pores of the core and of the mould; those of the mould give a fairly free passage outwards, but the core cannot do so, however porous it may be, if it is enveloped on all sides by the bronze. In this case the gases that should have passed away through the core come boiling up through the fluid metal, forcing their way to the vents, which themselves full of metal, can no longer act. The gases become imprisoned in the bronze as it sets, and the result is a bad, unsound casting, "blown on the core," as we say, and full of holes like a sponge. To avoid this the ancients cut their large works to pieces. The only drawback to cutting is, that unless it is skilfully done, it is impossible to join it again without altering the movement or proportion to some extent.

There are various ways of making these joints in bronze, but at present I will merely say that the ancients used to cover the joints, if possible, with a bracelet or band of ornament of some kind, and join the parts together with rivets. They also made a species of box-joint by bending a strip of metal round the inside of an arm, and rivetting it in such a manner as to allow a couple of inches to project beyond the edge of the cast metal; this projection was then forced into the corresponding edge of the part to be joined, and secured in position by rivets. These joints were frequently further strengthened by dowel plates of a double dove-tail form, which were counter-sunk in the thickness of the bronze, so that one dove-tail was on each side of the joint. In principle this method is much the same as that now in use, though in practice we have somewhat improved upon it. The system of cutting was, I think, always practised by the ancients, except in the case of very small bronzes, such as the little "Victory" or "Fortune" whichever she may be, and the charming statuette of "Venus," both of which are in the Naples Museum, as are also those other highly interesting examples of bronze work, which I have now the pleasure of bringing to your recollection.

The ancients, as far as I can discover, did not understand the practice, now almost universal, of putting a "lantern" into the core, and of core-vents. I shall speak of these later on, merely observing at present that it is possible to get very small castings quite sound, even when the core is shut in, and gives no exit whatever to the gases. This is, however, a difficult matter, because it is essential that the metal should be poured at its lowest possible temperature — that is to say, it must still be quite fluid, and fill the mould easily and at once. It must also be a very thin casting, and solidify before the heat has penetrated the core to any distance, in which case little or no disturbance can take place.

It is a matter of great difficulty to pour these small castings at the proper temperature, and in many cases it will be found that they have blown on the core from being too hot and setting too slowly, or that the metal has not been fluid enough to fill the mould properly and ensure a sharp casting.

The works of vast dimensions which were so often executed by the ancients, of which the most generally known is the Colossus of Rhodes, were probably not cast in very large pieces, but in sections of very considerable thickness, with flanges on the inside by which they could be bolted or rivetted together. They could thus be built up from the ground without the elaborate internal framing which would have been needed had they been, as some writers have supposed, made of thin wrought plates and rivetted together. Indeed, the difficulty of executing large works in beaten plate is so much greater than that of casting, that it would only be used under very special circumstances. It was so used by Ernest Rietschel, of Dresden, for the statue of Brunonia in a quadriga with four horses all larger than life. The reason for its use in this case being that the gateway at Brunswick, on which it was to be placed, was not considered strong enough to support the weight of cast metal. That the colossal statue of "Apollo" at Rhodes was cast work, and not beaten, I think is fairly certain, since it would seem that it lay prone and in ruins for nearly 900 years, after which the metal was sold to a Jew, who it is said, loaded 900 camels with his purchase. The weight of metal is said to have been 720,000 pounds and it seems hardly likely that sheet-metal would have lasted so long, or that it should not have been stolen away long before, had it not been for the size and weight of the pieces of which it was built up. This is almost all that I can tell you of the methods of the Grecian bronze founders, and of the sort of work that they produced.

Of the Romans I can only say that, although they had a passion for sculpture, they do not seem to have cared to produce for themselves that which they could more easily acquire by conquest. We find accordingly that whenever they wanted sculpture for any purpose they stole it from other people, and where this was not possible, owing to the non-existence of anything suitable to their purpose, they employed foreign artists in the execution of the work. The fashion of collecting bronzes in this simple way was set, so we are told, by no less a personage than Romulus himself, who carried off from Carmerium a bronze quadriga, which he placed in the temple of Vulcan, after having had a statue of himself placed in the car. We do not know who made the statue of Romulus, but it could hardly have been by any save an Etruscan artist.

According to Plutarch, one of the Tarquins dedicated a quadriga to Jupiter Capitolinus, and we are told that artists were brought from Veii for its execution. This seems probable, since Veii is only some twelve or fifteen miles from Rome, and was an ancient and civilized city long before the days of Romulus and Remus.

As early as the days of Numa, laws were made concerning sculpture, and one of these forbade the representation of the gods. But it does not seem to have been observed, since Tarquinius Priscus employed the sculptor Vulcanius, of Veii, to make a sculpture of Jupiter, which he placed in his temple on the Capitol. Another curious law of Numa's restricted the height of statues to great men. These were not to be more than three feet in height, and were hence known as *tripedaneæ*. It is, therefore, to be presumed that "half life-size," as we should now call it, was the size of the statue of Horatius Cocles, which was erected in the *comitium* after his noble defence of the bridge.

For very many years, then, the Roman demand for sculpture, whether in bronze or in marble, was supplied by foreign lands and foreign hands. Indeed, we are told by Perkins that the first foreign sculptor of whom any record is found is one Manurius Vitturius, who seems to have made copies in bronze of the *ancile*, or little shield which the Romans believed to have fallen from heaven; and although after that period a few names are found, still they are merely exceptions that prove the rule.

Greek artists, however, had been brought to Rome, and with them the traditions and practice of their native art. That these rapidly deteriorated amongst their new surroundings is hardly to be wondered at, since their employers and their public lacked the appreciation and the cultivation of ancient Greece. The emperors changed the fashion in art according to their own whim or love of ostentation. Caligula, says Perkins, decapitated Greek statues, and placed upon them his own vile head, while Nero gilded the masterpieces of Lysippus, and employed Zenodorus to erect a colossal statue of himself, which is estimated to have cost a sum equal to about £3,600,000 of our money. Pliny remarked that it showed how much the art of casting in bronze had deteriorated. It is hard to understand how this vast sum could have been spent on this statue, and it is a pity that we do not know more about it. It lasted, however, but a short time, having been destroyed by the people of Rome to mark their hatred of the man it represented. We have another work, however, of that period, in the equestrian bronze statue of Nero, in the museum at Naples. I am, however, of the opinion that this statue is rather a Greek than a Roman work, although I can give no account of its history or authorship, save that it was found at Pompeii.

In strong contrast to this work is the well-known equestrian statue of Marcus Aurelius, remarkable above all else as being, I believe, the only statue of an emperor which, from the time of its erection to the present day, has always been respected and carefully preserved by the Roman people. There is, I believe, nothing known as to its authorship, and we can only guess, from a certain heaviness and from its general style, that it is probably the work of a Roman artist or, at least, of a very Romanized Greek. This, at least, is the opinion of Perkins, and I must say that it is also my own. I am quite unable to find any signs of Greek feeling in it, and although it is undoubtedly, in many respects, a noble and impressive work, yet I must certainly protest against its being considered, as it has been by some writers and many readers, to be the finest equestrian statue in the world. Winckelmann, who seems to have a natural gift for mistakes of this sort, supposes this monument to have been of beaten plate, and this story has often been repeated. It is, however,

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nothing of the sort, but is a waste-wax bronze casting — not, however, cast at one pouring, but in separate pieces, as I have stated was usual among the ancients.

It would be too long, and indeed foreign, to our present purpose, to trace the decline of the art of the statuary in bronze through the various ages of the decline of the Roman power down to the final destruction of the last refuge of art by the siege and sack of Constantinople in the thirteenth century. There are, however, two bronze statues that I may mention as belonging to this period of decadence, one of which is supposed to represent either the Emperor Heraclius or Erico, King of Lombardy; it stands in the piazza of the town of Barletta. According to tradition, this statue was cast at Constantinople by a Byzantine artist named Polyphobus, about the middle of the seventh century. Perkins, however, considers it to be a genuine Italian work, and believes it to be of earlier date. I have never seen this statue myself, nor any photograph of it, but as Perkins was a most excellent judge of sculpture, he is probably correct in his estimate. The other is the well-known statue in bronze of St. Peter, in the basilica of St. Peter's at Rome. This statue is said to have been cast by order of Pope Leo I, as a thank-offering to the saint for his interposition and deliverance of the City of Rome from Attila. The date assigned to this statue is A. D. 153.

There is a legend that it is an antique, and was a statue of Jupiter, and that the head and hands only are of Christian origin. There is, however, no evidence of this, and, on the contrary, plenty of internal evidence that the work is of one period, and that not Classic. Possibly an antique Jupiter may have been melted down for the sake of the metal, and as a further honor to St. Peter by the destruction of a pagan divinity.

The period from the fifth to the ninth century gives us no record of any Roman artist, and we may easily understand that the iconoclastic war and wholesale destruction of statues, which was so vigorously prosecuted by Leo the Isaurian and his son in the eighth century, must have given the *coup de grâce* to the already dying art of the statue-founder; nevertheless, the persecution of artists, and the consequent emigration of numbers of them from Byzantium, was the means of spreading such tradition of the art as might have survived, into other and far distant lands, and the affiliation of numbers of these emigrants to the society or craft of the Comacine builders was the means of bringing a knowledge of the principles of the art into France, Germany and possibly into England also.

During the ninth and tenth centuries sculpture seems to have been at its lowest ebb. In the eleventh and twelfth centuries, however, the art began to receive some consideration, and artists, it is said, were sufficiently proud of their calling to begin once more to sign their works.

[To be continued.]

THE EIGHT-HOUR AGITATION.[1]

THIS is the fundamental principle or philosophy of the trades-union movement in this country, and, in 1888, the American Federation of Labor, numerically one of the strongest of the unions, voted to unite with the Eight-hour League, and thenceforth to concentrate all effort on the struggle for eight hours. Their programme was then to take charge of one trade at a time. Thus, in 1890, the gauge of battle fell to the lot of the carpenters, who accordingly struck, under orders, for an eight-hour day on May 1st, and won temporary victories in 137 cities. Plans were laid for the miners to strike on May 1, 1891, for eight hours, but the conditions were not then favorable; and, although these plans have since been in abeyance, owing to depressed conditions of trade, they have not been abandoned, and I have reason to believe that employers in almost all trades will be called upon to meet this question in the not very distant future.

The argument of the eight-hour philosophers is that, by restricting the hours of work, more laborers must be employed and the idle surplus provided for. I consider that this is specious reasoning. The overflowing stream of immigration from European countries, attracted to America by comparatively high wages, suffices even now to produce a permanent flood, at least in the fields of unskilled labor. If to this we add the still more powerful attraction of a legal working-day of eight hours, the tidal wave flowing from all the less-favored countries in the world would swamp our native industrial population, and induce a condition which would be far less favorable to them than that which now obtains.[2]

The eight-hour party has succeeded, through political influence, in making eight hours a legal working-day in Governmental employment, and largely also in municipal contracts, and violators of the law have been rigorously prosecuted. A remarkable case occurred in Buffalo, which worked great hardship upon a citizen, and led to the decision of Justice White, of the Superior Court at Buffalo, declaring the eight-hour law unconstitutional. Justice White's decision was based upon the clause of the Constitution which provides that "no person shall be deprived of life, liberty or property without due process of law." That provision of the constitution has been construed to mean that the rights and privileges of a citizen to make contracts relating to his business or property cannot be interfered with by legislation. It has been declared by the courts, that liberty, in its broad sense, as understood in this country, means the right not only of freedom from actual imprisonment, but the right of one to use his faculties in all lawful ways, to live and work where he will, to earn his livelihood in any lawful calling, and to pursue any lawful trade or vocation. All laws, therefore, which impair or trammel these rights, which limit one in his choice of a trade or profession, or confine him to work or live in a specified locality, or exclude him from his own house, or restrain his otherwise lawful movements, except where the public health or safety intervenes, are infringements upon his fundamental rights of liberty, which are under constitutional protection.[3] — People *vs.* Warren, 34 N. Y. Supp., Superior Court, Buffalo, 942.

The impossibility of regulating the rate and hours of labor by legislation, unless in the exercise of the police power, or law of public health and safety, was recognized years ago by Chief Justice Ruger, in McCarthy *vs.* Mayor, who said in reference to the original eight-hour law then under discussion:

"It is well to premise that this act was not intended to affect or regulate the rate of wages which should govern as between employer and employé. That subject is left by the act, as it always must remain, open, to be fixed by the agreement of the parties intending to enter into those relations. Experience has shown that legislation on the subject must always be futile and ineffectual, for the reason that it is controlled by the natural laws determining the value of labor and property, and which are as much beyond the power of statutes to affect as they are above the control of the wishes of the parties interested therein."

I do not mean to imply from the foregoing statements that I am opposed to shorter hours for labor; on the contrary, I believe that a shorter working-day, wherever it is practicable, is beneficial alike to employé and employer; but under present conditions, it appears to me, after a careful survey of the field, that there are some prominent obstructions which must be removed before an eight-hour day can be universally adopted, or before the operatives who now work ten hours a day can reasonably hope for a general reduction to eight hours without a corresponding reduction of wages.

[1] Appendix to an address delivered by A. E. Outerbridge to the students of the Wharton School of Finance, U. P. Philadelphia, and published in the *Journal* of the Franklin Institute.

[2] I am able to substantiate these views by figures bearing upon the subject. The official statistician of Paris, M. Bertillon, gives the proportion of foreigners in that city as 7.5 per cent; these are chiefly wealthy persons who distribute a portion of their funds among the tradespeople. London and Vienna have each 2.2 per cent. Berlin has 1.1 per cent of foreigners, also mainly persons of wealth.

The foreigners residing in American cities are chiefly poor immigrants, who compete with the native working-class for wages, and are accustomed and content to live in comparative squalor. The percentages of "foreign-born" to total population in five principal American cities are as follows: Philadelphia, 25.74 per cent; Boston, 35.27 per cent; New York, 42.23 per cent; Chicago, 40.98 per cent; Milwaukee, 38.92 per cent. More than 30 per cent of the foreign-born males, twenty-one years of age and over, in the five cities named, are aliens. The percentages of "persons of foreign parentage" to total population in these cities are as follows: Philadelphia, 56.58 per cent; Boston, 67.96 per cent; Chicago, 77.90 per cent; New York, 80.46 per cent; Milwaukee, 86.36 per cent. This information was courteously furnished by the Chief of the Census Division, Department of the Interior, Washington, March 12, 1896.

More rigid enforcement of contract-labor laws has decreased importation of foreign labor under direct or written contract, but there is ample evidence that Italian labor purveyors still influence such immigration. Immigrant Inspectors Birmingham and Hinkle reported (under date of January 11, 1895) to the Secretary of the Immigration Investigation Committee, among other facts, as follows: "Mr. Desabadia (an Italian *padrone* of New York) informed us that he was regularly engaged in supplying Italian laborers, in any numbers, to contractors or others desiring labor done; that he was prepared now to furnish from 200 to 600 men (Italians) for work of any nature; that he could furnish stone-masons, carpenters or men for almost any of the building operations."

The equivalent of the *padrone* system is not confined to Italians. Poles, Hungarians, Greeks and other foreigners, temporarily camping in this country, are forwarded, "on call," wherever large operations are in progress, crowding out American labor by accepting lower wages. In Texas and other border States, invasions of Mexicans occur at regular intervals, especially at sheep-shearing time; these people contribute nothing to the wealth of the country, and patronize the railways by walking home on the ties!

An investigation made by the Senate Committee on Immigration in 1893 (Senator Hill, chairman) developed the startling fact that Italian bankers remitted to Italy from New York City alone $25,000,000 to $30,000,000 a year, largely savings of "Dago" laborers, and a marked increase in wealth in certain sections of Italy has been traced directly to money earned in the United States by these "birds of passage." Italians who have become domiciled here for a few years are beginning to make incursions into skilled-labor fields where formerly they were unknown, and where even a suggestion of the kind would have been ridiculed. In the shoe trade, for example, it is said that large numbers of Italians have been substituted for American workmen who went out on strike some time ago.

The facts stated in these various foot-notes have been gathered by the writer at different times during several years from a variety of independent sources, and it is only when placed in juxtaposition that their true significance becomes apparent. These illustrations are but a few samples of facts at hand that are too numerous to mention, and they present practical problems for legislators and workers, of far more importance than any theoretical discussions.

[3] Henry J. Warren, superintendent of the Barber Asphalt Company, was convicted by a police-court in Buffalo, of a misdemeanor for a violation of this [eight-hour] section of the Buffalo charter, and punished by imprisonment. From his conviction he appealed to the Court of Sessions and to the General Term of the Supreme Court, where the conviction was affirmed, the courts holding the act constitutional and the conviction valid. As Warren could not by law appeal to the Court of Appeals in that case, he sued out a writ of *habeas corpus* in the Supreme Court, to test the questions affecting the validity of the conviction, and to inquire by what authority he was restrained of his liberty. This proceeding is a good illustration of the efficacy of the ancient writ of *habeas corpus*, for, although the Special and General Terms of the Supreme Court dismissed the writ, and again declared the prohibitory statute constitutional and the accused properly convicted, yet, upon an appeal to the Court of Appeals, the decisions of the lower courts were reversed, and the arrest, trial and conviction declared without jurisdiction and void.

"After this long and tedious fight Warren was released, only to be arrested again for a violation of the eight-hour law, this time for employing an alien Italian laborer. He was indicted by the grand jury, and convicted in the Superior Court at Buffalo. His counsel contended that the act in question, so far as it seemed to prohibit the employment of alien laborers upon public works, was repugnant to the Federal and State Constitutions and to the treaty between the United States and Italy. Upon an appeal to the General Term of the Superior Court, the act, so far as relates to the employment of aliens, was declared unconstitutional, and Warren was discharged." — People *vs.* Warren, 77 Hun., 120; People *ex rel.*, Warren *vs.* Sheriff, 144 N. Y., 225.

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Wise men usually count the cost of any new undertaking before embarking in it, and a very simple calculation will show surprising figures as to the additional cost of manufacture, should employers be called upon to pay the same wage for eight hours' that they now pay for ten hours' work. If we assume that an establishment employs a thousand hands (there are factories having capacity for four or five times this number) a reduction of two hours per day per man would mean an aggregate of two thousand hours' reduction per day in the shop. Assuming the average wage to be ten cents an hour (this is much below the true average) the additional cost for this item alone would be $200 per day; while the loss from decreased output and increased fixed charges, rate of interest on plant, etc., per unit of product, would, I believe, extinguish any margin of profit obtained under present prices in any manufactured article where competition is keen. It is, of course, possible that in those occupations in which the output depends more upon manual dexterity than upon the mere tending of automatic machinery, a decrease of working-hours may be partly offset by an increase of effort; but this would, I think, prove an exception, the effect of which is, in part at least, discounted by the low figure selected to represent average wages.

It is apparent that a rearrangement of some kind would be necessary; is it not likely that this rearrangement would be found in a corresponding reduction of wages?

Sympathizing as I do with all legitimate efforts of workingmen to better their condition, it appears to me that the aim of their organizations should be to secure a reduction in the hours of those workers who are now compelled to submit to clearly excessive consecutive hours of attention to duty — conditions that are not only deleterious to the welfare and happiness of the laborer himself, but in some instances increasing the danger to life and limb of others, whose interest and sympathy would be a powerful lever, if properly applied, to help to remove this incubus resting at present upon the boasted freedom of labor in this country.

If the views which I have here advanced shall have the effect of tending, on the one hand, to discourage the unwise and impracticable schemes of some misguided wage-workers, and, on the other hand, to stimulate keener and more general interest on the part of employers of labor in the welfare of their operatives, and thus to foster a closer union between these two great interdependent elements of society, I shall feel that my efforts have been repaid. The nature of my occupation for the past fifteen years has perhaps afforded unusually favorable opportunities for viewing both sides of the sociological questions here discussed; it has certainly aroused keen personal interest in the subject and has stimulated study of these problems.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

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NORTH FACADE, WING OF FRANCOIS I: CHÂTEAU DE BLOIS.

For description see article elsewhere in this issue.

COURT FACADE OF SAME WING.

PLAN OF THE CHÂTEAU AND GARDENS, BLOIS, FRANCE.

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NOTES AND CLIPPINGS

Soot and Smoke. — An item is now making the rounds which ought to afford factory owners who are wrestling with the smoke problem something to think about. The stack of a German sugar factory, so it is stated, was provided with a soot-catcher, and six days afterward the accumulation was removed and found to figure up about 6,700 pounds which, at a low estimate, ought to amount to about 175 tons in a year. While the correctness of the figures cannot be vouched for and a liberal discount may be in order, it is safe to presume that the result of the experiment was instructive. Soot-catchers are not very commonly used appurtenances to steam plants, and probably have little value except as means of complying with local smoke ordinances. But the object-lessons which they could teach might lead to very acceptable fuel economies. *Cassier's Magazine.*

Shall Plumbers use Bicycles? — A reform movement has been started among plumbers which may upset the traditions of the men in that trade. The bicycle craze has introduced the reform movement, and now a good many plumbers have taken to bicycle riding, and go to their jobs on wheels. They are thus enabled to attend to more jobs in a day. One of the fundamental rules of the plumber's trade, it is well known, is for a journeyman and his helpers to take the most roundabout way of going to their jobs, and taking as long a time as possible to complete them. Now, one journeyman on wheels can do as much work as three plumbers formerly did. Plumbers' Union, No. 73, of Indianapolis, is evidently alarmed over the outlook, and has passed strong resolutions condemning plumber wheelmen. These resolutions have been sent to all the plumbers' unions throughout the country for ratification. The resolutions ask the unions not to allow any of their members to ride bicycles during working hours, because a man doing jobwork and riding a wheel can do as much as three ordinary plumbers. — *N. Y. Times.*

Testing Quicksand. — Suppose we take a certain quantity of quicksand, dry it artificially, and then try to make it into quicksand again. Put it into a box and pour water on it carefully. Instantly the water is soaked up, and if we measure the volume, or better, the weight of the sand, we shall see that it takes up a quantity of water that measures 30 per cent of its own volume, or 20 per cent by weight. The rest stays above the layer of sand. If we now pierce a little hole in the bottom of the box, we shall see pure water run out; the sand forms a kind of immovable filter. Also, by turning the box upside down we see the sand keep its form like a stopper. It follows from this experiment that we cannot obtain quicksand in this way. We must reverse the condition of the experiment. Let us put the water into a vessel and sift in the dry sand in a thin stream, while shaking the vessel lightly. Then we shall get the thick but easily-flowing compound known as quicksand. That the mixture may keep its mobility two conditions are necessary: (1) The quantity of water contained must not be less than 21 per cent by weight. (2) The whole must be continually though lightly shaken. If we increase the proportion or interrupt the agitation for an instant, the mass settles down, retaining about 20 per cent of water, while the surplus, if it exists, rises to the top. — *La Nature (Paris).*

A Warning as to Piles. — It is a commonly accepted belief among architects, engineers and builders that piles cut off below the level of standing water are safe from decay, but Col. Peter C. Hains of the corps of engineers of the United States Army has recently described an experience with some Government fortifications which indicates the possibility of there being an occasional exception to this freedom from decay. Between the years 1833 and 1849 several thousand piles were driven for the foundation of a fort on an island in Delaware River. These piles were cut off about 20 inches below the level of mean low tide, the mean rise and fall of which is about five feet. The level of the standing water within the enclosure of the fort, while it varies somewhat with the tides, does not change to the same extent, so that the lowest level of the standing water where the piles were driven is above that of the mean low tide outside. Colonel Hains has not the slightest doubt but that the heads of the piles have been below the water-level ever since they were driven, yet some of them were eventually decayed to such an extent near their tops that a stick could be pushed several inches into the decayed part. The decay was confined chiefly to the sapwood in the upper four or five feet of the pile, and the surprising fact was noticed that the grillage resting on top of the piles was free from decay. The piles were of poor quality Chesapeake Bay pine, from twelve to fourteen inches in diameter, and many of them had apparently been injured by hard driving. The soil into which they were driven consists of a soft, bluish-black mud to a depth of 42 to 45 feet. From that depth to 85 feet, various strata of sand are found, some fine and some coarse. The sand strata contain plenty of water, the latter rising in the well within the fort above the level of mean low tide. Below a depth of 85 feet, there is said to be compact clay with boulders. The upper strata of mud have a disagreeable odor, with indications of marsh gas. — *Boston Transcript.*

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A DEMONSTRATION took place in London, as the *Builder* says, not long ago, on the part of the domestic servants of the city, who made various complaints of their lot, one of the things mentioned being the poor sleeping-accommodations provided for them in the London houses. The *Builder* thinks that this cannot be a very serious trouble, as any servant can leave a place where the bedrooms are not comfortable; but servants are human, as well as their masters and mistresses, and, while they will endure being uncomfortable for the sake of staying with people whom they like, they do not see why they should have to suffer discomfort for that purpose. That they have some reason for complaint, every architect can testify. In London, as the *Builder* says, footmen and other men-servants are often obliged to sleep in pantries, and, indeed, it was once thought desirable to give the butler a bedroom in the neighborhood of his pantry, so that he could look out for the silver. The women-servants are more commonly sent to the attic, but even here their rooms are apt to be small, dark and crowded. In American cities, as a rule, the intention is to give servants good rooms, but it is very common for the owners, particularly of large houses, to find that they need more servants than they have proper accommodation for, and, if they and their servants are mutually agreeable, the latter will put up with a good deal of inconvenience, if they see it to be unavoidable, rather than be disobliging. There is at least one Newport cottage in which thirty-five house-servants are kept, and many of the great New York establishments must be carried on in a similar style. Few owners, and still fewer architects, realize, in planning a fine house, how great a train of cooks, chambermaids, ladies'-maids, day-nurses, night-nurses, seamstresses, laundresses, butlers and footmen, may be needed later for the comfort of the family which is to occupy the house, and the consequence is apt to be that rooms for women-servants are improvised in dark garrets, and for men-servants in spare closets on the ground floor, or under the front steps, where we once knew a footman's room to be fitted up. The *Builder* suggests that servants' rooms in dwelling-houses should be placed under the charge of an official inspector, who should make regular visits to ascertain whether they were wholesome and comfortable; but we imagine that in most houses the whole family, servants and all, would rebel against such surveillance, and the best way of reaching the trouble, under present conditions, is probably for architects to inform themselves, so far as they can, in regard to the mode of life in the great houses which are rapidly multiplying in this country, so that they can guide a wealthy client in making proper provision for all the members of the family which may be expected to gather gradually around him.

THE New York architects have a new subject for their archæological zeal, in the shape of the Tombs prison, which is to be torn down, to make room for a larger and more convenient structure. As every one knows, the Tombs is a clever adaptation of Egyptian architecture to city uses, and, as jails do not need windows on the outside, it has served its purpose very well, and has won from architects the regard which is usually attracted by broad wall-surfaces and well-proportioned details. Whether its beauties entitle it to be transported bodily to the Central Park, as is seriously proposed, is another matter. It is suggested that it might be set up beside the obelisk, with which it would unquestionably harmonize, and could be utilized as a part of the Metropolitan Museum of Fine Arts; but we are not informed whether the Trustees of the Museum favor this scheme, and it is not altogether certain that the effect of associating the real Egyptian work with the imitation would be happy.

ERNST CURTIUS, the noted historian and archæologist, died at Berlin a few days ago, at the age of eighty-two. Curtius was born in Lübeck, and was trained in classical learning in his native town, and afterwards at the universities of Bonn, Göttingen and Berlin. His first visit to Greece was made with Professor Brandis in 1837, and, soon afterwards, he accompanied Professor Ottfried Müller in his expedition through the Peloponnesus. Returning to Berlin in 1840, he was made Secretary of the Royal Academy of Sciences, and tutor to Prince Frederick William of Prussia. In 1856, he was appointed Professor at Göttingen, and, some years later, was sent again to Greece, where he began the explorations at Olympia with which his name has been particularly connected. For many years he had been Director of the Antiquarian Department of the Royal Museum at Berlin.

MR. WILLIAM HAMILTON GIBSON, well known for his writings on natural history, and the beautiful drawings by which he illustrated them, died a few days ago. It is said that Mr. Gibson found in his youth very little encouragement in his artistic tastes, and it was only by much hard work, and through many disappointments, that he attained the position which he so brilliantly filled. He was a passionate lover of nature, and, in the end, nature never fails to help her worshippers. From an indifferent sketcher of things in which he took no special interest, he became the inspired interpreter of the objects that he loved, and he long ago acquired a fame which few artists working, as he did mainly, in black-and-white, attain in these days.

THE law applying to cases of union tyranny is becoming every day more settled, and the "scabs," or, in other words, the men who are independent enough, and American enough, to think that they are entitled to work for such employers as they think fit, and on such terms as they and their employers may agree to, are decidedly beginning to take heart. A few days ago a case was tried in a New York court, in which it appeared that a certain member of the Tile-layers' Union, named Dobson, who had fallen behind in payment of his dues, and owed about eight dollars to the Union, was, at a meeting of the Union, which he did not attend, suspended. The next day, a walking-delegate sought him out at the place where he was working with two other men, also members of the Union, and ordered him to stop work, telling him that he had been suspended for non-payment of dues. Dobson offered to pay them on the spot, but the walking-delegate refused to receive the money, saying that it could only be accepted at a regular meeting of the Union. As Dobson refused to stop work, the walking-delegate ordered the other two men out, and they accordingly packed up their tools and departed. They went, however, directly to the contractor who employed them, and told him the circumstances, saying that they could not return to work until Dobson was discharged. The contractor, whose name was Armstrong, hoping to arrange the matter,

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went to Dobson, and told him that he must be laid off temporarily, and with this understanding the other two men went back to work. The next day, however, the walking-delegate went to Armstrong, and said that if he put Dobson at work again, all the men in his employ would be called out. Armstrong thereupon discharged Dobson, but, anxious to do everything that he could for him, wrote to the President of the Union, offering to pay Dobson's dues himself, for the sake of having him allowed to return to work. His offer was refused, and he then advised Dobson to seek relief in the courts from his persecutors. A charge of conspiracy was therefore lodged against the walking-delegate, who was promptly arrested, and held in five hundred dollars bail for trial. In ordering the walking-delegate to be held for trial, the justice expressed what is becoming the usual feeling of judges on these subjects, saying that "neither a union nor an individual has a right to dictate to an employer as to whom he must employ."

EVERY one who has read the story of the adventures of Mr. F. H. Cushing among the Zuñi Indians, the adoption of the young archæologist into a Zuñi family, his initiation into the lower grades of the priesthood, and, in consequence, into the sacred traditions which revealed the history and the foreign origin of the strange race of the "Pueblo" Indians, will be rejoiced to learn that the Smithsonian Institute, aided by the University Archæological Association, has sent this incomparable explorer to the Gulf of Mexico, where he has made some curious discoveries, particularly in the coral islands known as the Florida Keys. These islands, which are now almost deserted, contain vast heaps of shells, and on some of these shells Mr. Cushing has found drawings and hieroglyphics which resemble so closely the sculptured work of the temples at Palenque and Chichen-Itza, in Yucatan, as to indicate that there must have been communication between the Maya kingdom of Yucatan and the Florida Keys, as there was known to have been between Yucatan and Cuba. The character of the Florida shell-heaps does not indicate that an extensive Maya settlement ever existed there, but their occurrence, not only in Florida and Cuba, but on other parts of the Gulf coast, seems to show that the Mayas, as an enterprising commercial nation, maintained trading-posts at various points within reach of their canoes, something as the Phœnicians, and, later, the Carthaginians, kept up trading-stations, near enough to each other to give assistance in case of attack, in nearly all parts of the Mediterranean coast; or as the strange people who built Stonehenge, and the menhirs of Brittany, established a caravan route, fortified, perhaps, by little military and trading stations, whose mystic dolmens still remain, between their country, perhaps the Lyonnesse of King Arthur, or, more probably, a community of far more ancient date, the Spanish peninsula, and Africa beyond. In the case of the Mayas, however, archæologists have the advantage that the race to be studied still exists, although its greatness has disappeared. It is estimated that in Yucatan there are still about two hundred thousand Mayas of pure blood, with about half as many of mixed descent. All these speak the Maya language, and it is a striking testimony to the fullness and flexibility of that language, and to the civilization of the ancient people from whom it has descended, that many of the Spaniards and other white inhabitants of the country have discarded and forgotten their own language, and use the Maya entirely in their own conversation.

WHETHER the modern Maya language can throw any light on the ancient inscriptions of Palenque, which have so long puzzled archæologists, remains to be seen, and no one is better fitted than Mr. Cushing to study the subject. At the time of the Spanish conquest, Palenque and Copan, the two greatest Maya cities, were already in ruins, and overgrown by the forest, but Uxmal and Chichen-Itza were still inhabited, and from their people the Spaniards learned that the Mayas had then occupied the country for at least eight hundred years. This would carry back the Maya conquest of Yucatan to about the date of the accession of Charlemagne, and it is likely that, as usual in such cases, the Mayas very much underrated the time that had elapsed since the arrival of their ancestors in the country. It is hardly necessary to say that problems of extreme interest remain to be solved in connection with Maya antiquities. Their ancient writing is absolutely unintelligible. Although Dr. Le Plongeon supposed that he discovered in it a resemblance to the old Chinese character — which is not at all unlikely, since many indications point to the settlement of our hemisphere from Asia — he did not pretend to decipher it, and it is still uncertain whether it is essentially picture-writing, like the Egyptian hieroglyphics, or phonetic, like all European languages. Besides the Maya temples, there are in Central America, according to Dr. Le Plongeon, other most interesting subjects of study. Our readers will remember his account of the race of timid little dwarfs, who still inhabit the forests of Central America, and are occasionally seen watching from a distance the movements of exploring parties, and of his discovery, on an island, of a pigmy city, with houses of masonry, and what appeared to be a triumphal arch, under which an ordinary man could not walk without stooping; and, even if these curiosities should turn out to owe something of their charm to Dr. Le Plongeon's imagination, there would be an interest of another kind in a visit to what Stephens and Catherwood, the first American explorers of the country, reported, in their official account, to be the best people in the world, so innocent and sincere as to recall the ancient legends of the golden age.

A CURIOUS piece of industrial legislation, which, in view of the rapid development of South Africa, may be of importance to our manufacturers, has been brought again to notice in the Transvaal Republic. In addition to its vast gold-mines, the Transvaal possesses mines of coal and iron, the former of which have been successfully worked for several years. A concession was granted in 1882 for working the iron-mines, and establishing blast furnaces and steel plants, and attached to the concession was an agreement to the effect that, as soon as ten thousand tons of cast-iron should have been produced by the establishment operating under the concession, a duty of ninety dollars a ton should be placed on all articles of steel or iron thenceforth imported into the Republic. Of course, such a duty would be practically prohibitory, except in the case of cutlery and fine hardware, so that the owners of the local plant would have their market to themselves; and although no one was willing, fourteen years ago, to undertake the establishment of iron-works, even on those terms, the act of concession is still in force, and steps have been taken toward securing the necessary capital for taking advantage of it.

THE French Northern Railway has decided to furnish its carriages with sashes made of aluminium, which, it is hoped, will be stronger and lighter than those of wood, will cut off less light, and will not be subject to the obstinate sticking which enables car-windows in the dog-days to defy all attempts to open them. Whether they will exclude dust as perfectly as wooden sashes, and how the drops of water which will condense on their inner surfaces in cold weather will be disposed of, remains to be seen; but if provision could be made, perhaps by riveting or cementing strips of felt on the sashes, for preventing condensation and keeping out dust, it seems as if such sashes might be useful to us as well as to the French. The latter, as the *Revue Industrielle* informs us, expect to make the aluminium sashes ornamental, by polishing the inner surface, and giving the outside a neat finish. We venture to predict that this part of the plan will soon be abandoned. The common idea, derived from the descriptions in scientific books, that "aluminium is a metal of a silvery white color, unchanging in the air," is, in practice, hardly applicable to the commercial material. Silvery as it may be when new, or, possibly, when exposed to air alone, it acquires by handling a dull leaden color, often variegated by ashy specks, which is anything but ornamental. Lacquering preserves it for a time, but the yellow of the lacquer is not agreeable over the white of the aluminium, and, sooner or later, the lacquer wears off, and the metal changes color. Moreover, aluminium, even when new and shining, has the property of blackening the hands or clothes, like lead, although in a less degree. This property alone renders pure aluminium a rather inconvenient metal to use for purposes to which otherwise its lightness would well adapt it; and, until some method is discovered for plating it with nickel or silver, or for alloying it in such a way as to prevent tarnishing, it is not likely to be extensively employed for ornamental purposes.

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HISTORY OF THE UNITED STATES CAPITOL.[1]—V.

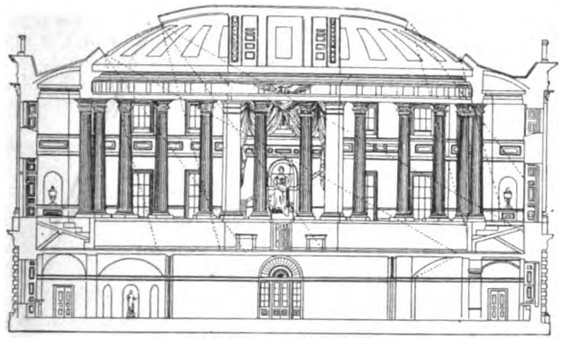


Fig. 24. Latrobe's Modification of Old House: Longitudinal Section.

JEFFERSON told Dr. Thornton no alterations should be permitted, when Latrobe was appointed without allowing Thornton an opportunity of giving his judgment upon the changes. In Latrobe's letters to Lenthall, he describes his troubles in obtaining the President's consent to change the form of the House of Representatives, and freely criticises the President and Congress. The majority of the suggestions made by Jefferson were approved by Latrobe. Sometimes Mr. Jefferson insisted on points against which Latrobe protested.[2]

A letter from Mr. Latrobe to the Secretary of the Navy, 1811, published in the appendix to Dunlap's "*History of the Rise and Progress of the Arts of Design in the United States*," refers to Jefferson's positive orders "that I should introduce Corinthian columns into the House of Representatives, and put one hundred lights of plate-glass into the ceiling contrary to my declared judgment, urgent entreaties and representations. In other respects, however, the honor which the friendship of the great man has done me obliterates all feelings of dissatisfaction on account of those errors of a vitiated taste and an imperfect attention to the practical effect of his architectural projects." Latrobe wanted to make the capitals of the column on the model of the Clepsydra at Athens, or the Roman Doric as exhibited in the Theatre of Marcellus, at Rome (see Figs. 24 and 25).

In his letter which accompanied the drawings from which the illustrations are made, he suggests that the bells of the capital be cast in iron in one piece, with the upper row of plain leaves, while the others may be cast separately and rivetted on.

Jefferson first recommended burnt-brick columns with hewn-stone capitals and bases, but insisted on the capitals being modelled from the Choragic Monument of Lysicrates. The columns were made of freestone on this latter model.

In reference to the skylight, Mr. Jefferson insisted "that the alternate panels in the alternate rows of panels into which the ceiling

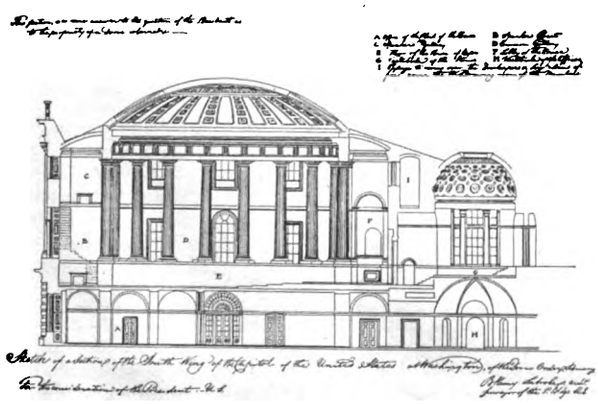


Fig. 25. Latrobe's Modification of Old House: Cross Section.

was divided should be of plate-glass." Latrobe objected, because of cross-lights, leakage and condensation, and he was having the work done without the glass, when Lenthall received the following letter from Jefferson.

WASHINGTON, D. C., October 21, '06.

Dear Sir, — The skylights in the Dome of the House of Representatives Chamber were a part of the plan as settled and communicated to Mr. Latrobe; that the preparation for them has not been made and the building now to be stopped for them has been wrong; to correct that wrong now they must be immediately prepared, and that the building may be delayed as short a time as possible as many hands as possible should be employed in preparing them.

Accept my salutations and best wishes, TH. JEFFERSON.

Mr. Lenthall.

The ceiling when finished was decorated by George Bridgport, a prominent decorative painter of the day. It was considered successful as a decorative element, but was open to the practical objections Latrobe had urged against it.

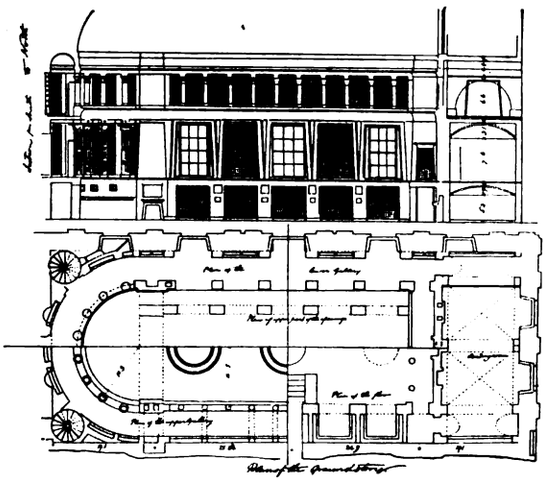


Fig. 26. Library opposite Senate, North Wing.

Latrobe's letters to Lenthall throw light on the every-day troubles in the progress of the building during this period. August 12, 1805, in answer to a criticism calling attention to a lack of drawings for the cornices and entablatures, Latrobe quotes from former letters in which he has told Lenthall to follow Sir Wm. Chambers, "Now you have Wm. Chambers's book, and I have not. I choose rather to refer you to it, than involve you in the possibilities of a mistake of mine which might have occurred by rendering the feet and inches of Stuart or Desgodetz into parts of a module, and ten minutes would suffice you who have these things at your finger ends to have become master of the whole subject."

Lenthall constantly urged upon Latrobe the necessity for his permanent residence in Washington, and Latrobe as constantly deferred the matter and simply made visits at long intervals, Latrobe lived in New Castle, Wilmington, Philadelphia and other towns, wherever he found it most convenient for his private work on the Delaware and Chesapeake Canal. The greater part of his supervision of the Capitol was performed through correspondence with Lenthall.



Fig. 26*a*. John Lenthall.

March 3, 1896, Latrobe mentions the arrival from Italy of Giuseppe Franzoni and Giovanni Andrei with the following comments: "Franzoni is a most excellent sculptor, and capable of cutting our figure of Liberty, and Andrei excels more in decoration. I wish they would seek clay for modelling and then model one of our capitals."

Latrobe found considerable difficulty in keeping the arched ceilings from falling. In answer to one of Lenthall's letters, December 31, 1806, he says: "I am sorry the arches have fallen, but I have had these accidents before on a larger scale, and must, therefore, grin and bear it." Thornton twitted Latrobe on his vaults falling in Richmond, the Treasury and the Capitol, because of insufficient abutment, or no tie-rods.

[1] All rights reserved. Continued from No. 1071, page 5.

[2] The progress of the work during this period is shown in the different reports. September, 1806. "The front is near the height of the attic windows, but the rear is not above six feet above the vestibule floor." March, 1808, the woodwork of the south wing was complete, ready for the painting. The twenty-four Corinthian columns in the House of Representatives progressed slowly, as only two were finished, eight partly finished and fourteen only roughed out. The trouble with stoves or furnaces in basement and the echo is discussed by Latrobe at great length in this report. North wing. The wooden skylight and cove over main staircase hall was taken down and replaced by a brick cupola, 35 by 45 feet, crowned by a lantern. In 1809, other portions of the north wing wooden construction was replaced by brick.

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July 16, 1808, one of the larger arches in the staircase-hall showed evidence of giving way and quite a number of letters passed between Latrobe and Lenthall in reference to the subject. In September, 1808, Lenthall was killed by the falling of this arch. (Fig. 26 *a*, portrait of Lenthall.[1])

The acoustic qualities of the new Hall of Representatives were very defective. A contemporary says that Randolph, of Roanoke, declared the Chamber was "handsome and fit for anything but the use intended."

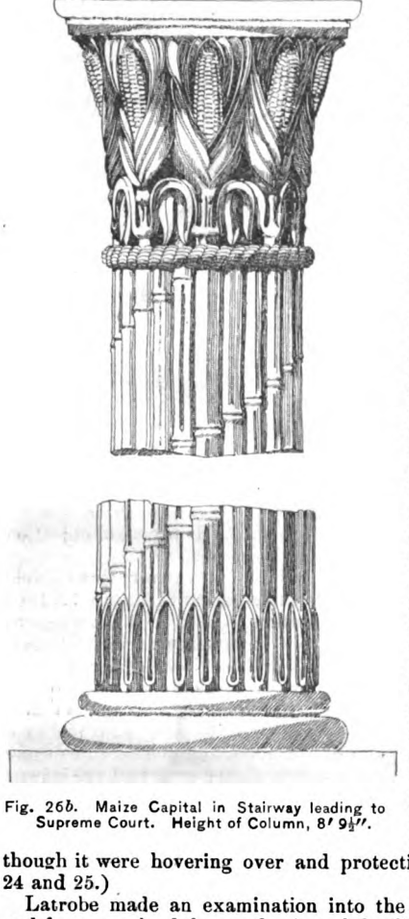


Fig. 26*b*. Maize Capital in Stairway leading to Supreme Court. Height of Column, 8′ 9½″.

Thornton's advice was asked as to the best method of correcting the echo and he recommended hanging curtains behind the columns. He at the same time called attention to the fact that if his plan had been strictly adhered to, this echo would not have occurred.

J. H. B. Latrobe, the son of the architect, says that he can recall, as a recollection of his boyhood, the old Hall of Representatives. "I can see the heavy crimson drapery that hung in massive folds between the tall fluted Corinthian columns to within a short distance of their base; and I remember, or think I remember, the low gilded railing that ran from base to base, and over which the spectators in the gallery looked down upon the members on the floor. I seem to see even now the Speaker's chair with its rich surroundings, and the great stone eagle with out-spread wings projecting from the frieze, as though it were hovering over and protecting those below." (Figs. 24 and 25.)

Latrobe made an examination into the condition of the timbers and frame-work of the north wing of the Capitol in the latter part of 1805. He found the joists and beams much affected by dry-rot, and the plastering badly cracked. At a later date he says: "The tenons of the oak joists were entirely gone, and the only species of timber that has withstood decay was the pine and poplar of which the beams were made; all the white oak was seized with dry-rot; almost all the plates and bond-timbers which were partially buried in the walls were, on the interior, reduced to powder.

"Upon the damaged part of such timber the brick piers of the Senate Chamber stood. [Presumably this has reference to bond-timbers let into the wall according to English methods. Both Hoban and Hadfield as superintendents would naturally have followed English precedents.] Independently of the general rottenness of the timber, the frequent alterations which the design had undergone in its original progress had so weakened the work and one of the heaviest walls had been so cut down in its lower part, that whenever

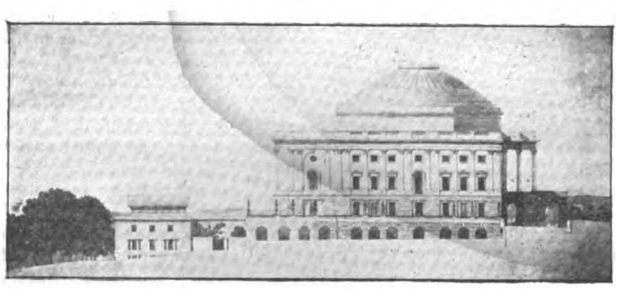


Fig. 27. South Elevation: Drawing by Latrobe, 1811.

the timber had given way the top must have fallen in the Senate Chamber."

It is difficult to account for the sudden decay of the timber mentioned by Latrobe in this letter. It is unfortunate that the only report is from the party interested in removing or changing, however slightly, the work done by his predecessor.

Hadfield, who superintended the greater portion of the construction of his work, was, judging from documents on record, inefficient in the practical details of building superintendence. (See *American Architect*, June 13.) While a large part of the north wing was constructed under Hadfield's superintendence, the work was completed under the superintendence of James Hoban and there is nothing to show that Hoban was not most skilful in the services he rendered to the Government. These services extended, with a few intermissions, over a period of forty years.



Fig. 28. West Elevation: Drawing by Latrobe, 1811.

The wooden portions of the north wing and other perishable or decaying materials were removed during Latrobe's incumbency and were replaced with brickwork or sound material.

Although Latrobe altered the details in many places, it will be seen, by a comparison of this portion of the building with the plans, that Thornton's scheme was maintained.

One of the pieces of original design in the east basement vestibule senate wing on which Latrobe prided himself were the capitals of the "American order" as it has been called. The design of the capitals has been repeatedly attributed to Jefferson, and J. H. B. Latrobe quotes one of his father's letters which establishes the authorship. This letter, which was sent to Monticello August 28, 1809, would never have been written to Jefferson if the design had originated with the President.

"*Dear Sir*, — I have packed up and sent to Richmond to be forwarded to Monticello a box containing the model of the capital of the columns of the lower vestibule of the Senatorial Department of the north wing of the Capitol, which is composed of maise, on a short fustrum running about four feet from the grounds. It may serve for a dial stand, and should you appropriate it for that use I will forward to you a horizontal dial in Pennsylvania marble of the proper size. These capitals during the summer session obtained me more applause from members of Congress than all the works of magnitude or difficulty that surrounded them. They christened them the 'Corn-cob Capitals,' whether for the sake of alliteration I cannot tell, but certainly not very appropriately. (Fig. 26 *b*.) This capital made of freestone is now, 1896, in the Hall at Monticello."

The elliptical brickwork around the stairway was found to be so substantial that it was not replaced. The original brickwork is in place at the present time.

The central portion of the Capitol was not built for many years after Latrobe's connection with the work ceased, yet his drawings made in 1811 of the south and west elevations (Figs. 27 and 28), and a perspective in a book of travels by D. B. Warden, published in Paris in 1816, made from Latrobe's drawings of that period (Fig. 29 *a*), show what should be credited to him for work on the exterior central portions of the building.

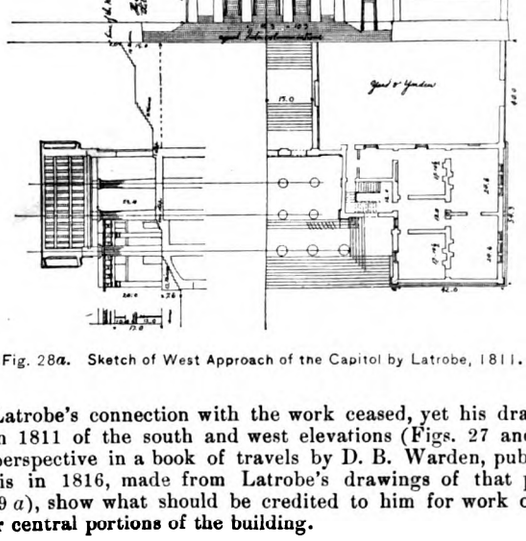


Fig. 28*a*. Sketch of West Approach of the Capitol by Latrobe, 1811.

[1] John Lenthall. Born in England, 1762, died September, 1808, was the great-great-grandson of Sir John Lenthall, the fourth of the name who was a member of Parliament, and whose father, Sir Wm. Lenthall, was Speaker of the House of Commons. Latrobe had a very high opinion of Lenthall's ability, saying just a short time before Lenthall's death: "I gave you the office from no motive whatever, but a conviction that in skill and integrity I should not find your superior, a conviction which experience has since verified."

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The basement, the proportions of the order, covering the principal story and attic, and the fenestration necessarily conformed with Thornton's wing. The eastern portico is a modification and enlargement of the one designed by Thornton. (Fig. 21.)

The broad flight of steps from principal story to the ground, east front, and the colonnade extending to the wings were additions by

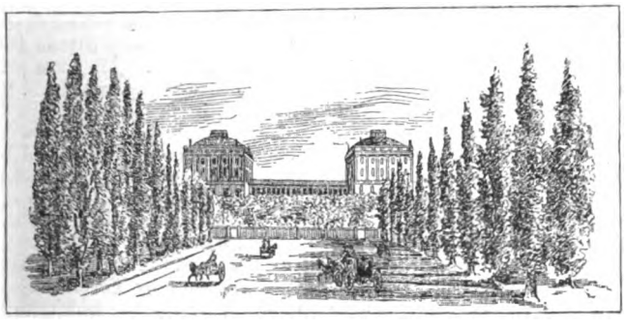


Fig. 29. The Capitol, 1811-14, from Pennsylvania Ave.

Latrobe, designed at this period, and finally executed (Figs. 27 and 29 *a*).

It is constantly asserted in conversation and it has been reiterated again and again in written matter that the principal façade of the Capitol was made on the eastern front because the most important part of the city was expected to be built in that direction. It does not seem reasonable to suppose that the original projectors would have planned the larger portion of the city and parking system, with the President's House and other principal edifices on the west of the Capitol, at the same time intending or thinking that the principal portion of the city would be on the east of that building. As a matter of fact, the most dignified and impressive front of the original design for the Capitol faced toward the President's House, or west. According to the original plan, the Capitol was visible from the President's House down Pennsylvania Avenue. There is no doubt but that the most pleasing effect was intended to be produced on this side.

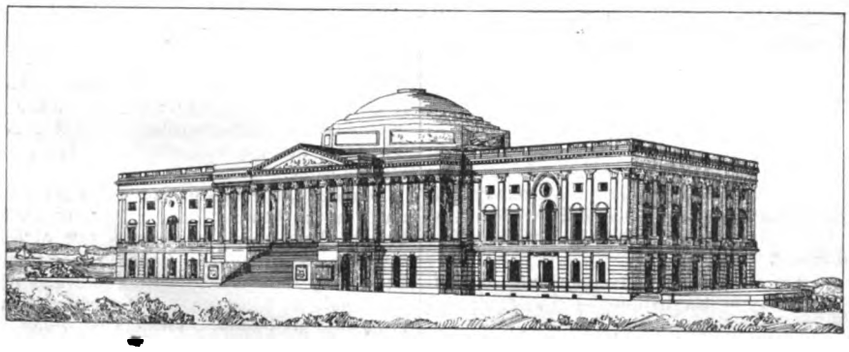


Fig. 29*a*. Perspective made from Latrobe's Drawings. Published in Paris, 1816.

Thornton's design had a grand semicircular colonnade or portico in the centre of the western front with a broad sweep of circular steps running from the principal story to the ground (Fig. 21*a*) while he shows a portico on the east with a basement entrance. (Fig. 21.) Latrobe's drawings, made in 1811 (See Fig. 29 *a*), shows the west portico practically as it stands at the present time.

For some reason Latrobe was allowed to change the original design so as to make the principal front on the east. It may have been because there was a tendency at this period (seventeen years after the first design was made) to build the principal residences on the hill.

The drawing of Latrobe shows (Fig. 28) a very crude and peculiar entrance from the west. It is nothing more nor less than a small Doric temple at the foot of the hill.

The change in the western front indicated on the drawing (Fig. 28) was executed, with modifications, by Bulfinch which materially changed its appearance. The terrace temple was happily omitted.

Neither Latrobe's nor Bulfinch's designs are happy alterations of the original.

Latrobe modified Thornton's form of dome by increasing the height, but it was not executed on the lines suggested.

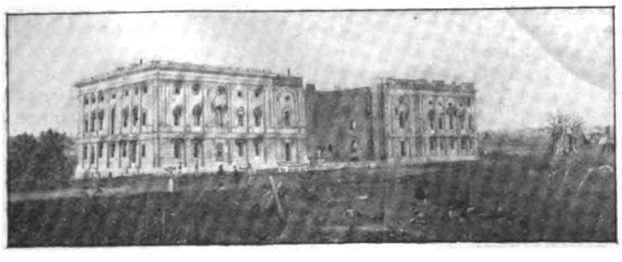


Fig. 30. Chittenden's Drawing of Capitol after the Fire.

Several notes in one of Thornton's pamphlets would indicate that at one time Latrobe contemplated the omission of the central dome and rotunda which were features of the original design. He makes Latrobe say: "The entrance will be in the recess. It may seem contradictory when I say (Line 14, p. 18[1]) that he [Jefferson] directed that I should deviate as little as possible from the plan approved by General Washington," and that "he [Jefferson] approved of the present plan in which by this recess I block out the dome [In another place he calls it the principal dome, to distinguish it from the dome which Hallet placed over the circular portico], which the General [Washington] directed should be restored when left out by Mr. Hallet. [See Figs. 16 and 17.] But if you consider what use this was intended for after his death was announced to a Federal Congress you will not blame me."

After Washington's death Congress proposed to place a statue to him under the dome. This plan to omit the dome does not appear to have been seriously considered, as it was probably opposed by others in authority.

The country in 1811 was on unfriendly terms with Great Britain and a war was impending. The Congress sitting in that year ceased to make appropriations for Public Buildings.

The Capitol at this period consisted of two wings, connected by a corridor made of rough boards. (See Fig. 29.) The greater part of the foundation of the central portion was in place.

The surroundings of the Capitol at this time must have been truly forlorn. The grounds and apparently the sidewalks and driveways uncared for, even if they had ever been made. The Chairman of the Committee on Public Buildings and Grounds wrote to Latrobe, February 8, 1811, suggesting the importance of levelling an area of 60 feet wide in front for carriages, "which ought to be a hundred feet wide," and carrying a permanent platform on the south wing as far as the gallery door on the southeast corner and on the north to the north door to facilitate entrance into the Court-room. "Except for motives of economy he would advise the extension of platforms to the western angles of both wings."

J. H. B. Latrobe [son of the architect], who had a personal recollection of the city at that time, says, "Pennsylvania Avenue was little better than a common country road. On either side were two rows of Lombardy poplars, between which was a ditch often filled with stagnant water, with crossing-places at the intersecting streets. Outside of the poplars was a narrow footway, on which carriages often intruded to deposit their occupants at the brick pavements on which the few houses scattered along the Avenue abutted. In dry weather the Avenue was all dust; in wet weather, all mud. . .

"The Capitol itself stood on a steep declivity, clothed with old oaks and seamed with numerous gullies. Between it and the Navy Yard were few buildings, here and there, over an arid common; following the amphitheatre of hills from the southeast around to the heights of Georgetown, houses few and far between indicated the beginning of the present city.

"The Patent and Post Offices in one huge, unornamental, barn-like, brick edifice occupied the place of their successors [This was Blodgett's Hotel on E and 8th Streets], and at the other end of the Avenue the White House had become a conspicuous object with the adjacent public offices. Still following the amphitheatre around, the eye caught a glimpse of Alexandria and rested upon the broad expanse of water where the eastern branch joined the Potomac."

In the month of August, 1814, the British captured Washington, and on August 24th the Capitol and White House were burned. The British intended the complete destruction of these buildings. Happily, their efforts were only partially successful. The greater part of the exterior and the principal divisions of the interior resisted their efforts. The soldiers piled the interior of the Senate and House Chambers, as well as the wooden corridor between the wings, with inflammable material and made a great blaze. All the woodwork and some of the stone and brick work was damaged. Andrei, one of the sculptors on the Capitol when the work stopped, made a very interesting drawing, showing the effect of the fire on the sandstone columns in the Hall of Representatives. A reproduction cannot do justice to the delicacy of the original, which is in pencil, emphasized wherever necessary by a delicate wash. The workmen in repairing or pulling down were afraid to work until the most dangerous portions of this part of the building were shored up. This drawing indicates the method adopted for shoring, as well as the damage done to the stonework. At this period a Mr. Chittenden, a miniature painter, was in Washington and he made interesting colored drawings of both the Capitol and President's House, showing the damage produced by the fire on the exterior of the buildings. Figure 30 shows a reproduction of the former.

Latrobe gives the following graphic description of the effect of

[1] Reference to a private letter to Congressmen. A pamphlet by Latrobe.

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the fire: "In the Hall of Representatives the devastation has been dreadful. There was no want of materials for the conflagration, for when the number of members of Congress was increased, the old platform was left in its place and another raised over it, giving an additional quantity of dry and loose timber. All the stages and seats of the galleries were of timber and yellow pine. The mahogany desks, tables and chairs were in their places. At first, rockets were fired through the roof, but they did not set fire to it. They sent men on it, but it was covered with sheet-iron. At last they made a great pile in the centre of the room of the furniture and, retiring, set fire to a quantity of rocket stuff in the middle. The whole was soon in a blaze, and so intense was the flame that the glass of the lights was melted and I have now lumps weighing many pounds, run into a mass. The stone is like most freestone, unable to resist the force of flame, and I believe no known material would have been able to resist so sudden and intense a heat. The exterior of the columns and entablature scaled off and not a vestige of sculpture or fluting remained."

The damage done by the fire was not investigated until the war with Great Britain was at an end.

The burning of the Capitol left Congress and the Supreme Court no suitable place for the transaction of business.

The thirteenth Congress met September 19, 1814, in a building erected for a hotel on the corner of 8th and E Streets (the site of the United States Post-office) by Samuel Blodgett which in 1814 was used as the Government Patent and Post Office. This building was saved by Dr. Wm. Thornton's exertions, he having been able to persuade the British officers, Ross and Cockburn, that science would sustain a serious loss by the destruction of the patent models and records which were at this time in his charge.

This was the only available building, but the accommodation it afforded was inadequate.

The prominent citizens of the District, for fear that Congress might leave the city, organized a stock company known as the "Capitol Hotel Company," to erect a building for the temporary accommodation of Congress. This structure was commenced July 4, 1815, and occupied by Congress from December, 1815 to 1819, while the Capitol was being rebuilt. This building, which is on the corner of North A and 1st Streets, has since that period been called the "Old Capitol." It again became noted during the Civil War as a prison for Southern sympathizers. Glenn Brown.

(To be continued.)

THE ART OF BRONZE CASTING IN EUROPE.[1]—II.

In the twelfth century we once more find the bronze founder to the front. Borisanno of Trani, Simone di Ragusa, Bonnano of Pisa and Jacopo of Innsbruck, were all busy as builders, carvers and bronze founders, and cast bronze gates for several of the religious buildings of Italy and Sicily.

In the thirteenth century again we have the names, not only of foreign, but also I am glad to say of English, artist founders; unfortunately most of their works have been destroyed.

There are records of statuettes in bronze and also in silver by Simon of Wells, A. D. 1257, and by William of Gloucester, about the same date. A few years later, in 1281, we have the statue of Henry III, followed in 1290 by that of Eleanor of Castile, both by William Torell, or Turell, who was a sculptor, goldsmith and a citizen of London. At the close of the fourteenth century we had Nicholas Broker and Godfrey Prest, who, in 1397, erected the statues of Richard II and of Anne of Bohemia, both on one tomb in Westminster Abbey.

It is perhaps not uninstructive to note by the erection of bronzes in Westminster Abbey the fluctuating fortunes of the art. Thus in the thirteenth century we have recorded the erection of six works; fourteenth century, twelve; fifteenth century, ten; sixteenth century, nine; seventeenth century, six; eighteenth century, two; nineteenth century, six; total, fifty-one works. The above list begins with the year 1246, monument to Abbot Berkyng, and ends in 1887, Mr. Alfred Gilbert's monument to Mr. Fawcet. Of these fifty-one bronzes, many are no longer extant, and others are not, strictly speaking, bronze, but are incised work, generally known as "brasses."

For the present I shall only speak of the bronzes by Torell, Broker and Prest. The earlier ones, those by Torell, are most interesting works, and as examples of early English statue-founding, invaluable. They are cast in one piece and are enormously thick, almost solid. A few years ago, when some repairs were required to the stonework, I had an opportunity of examining the under side, which showed a shallow depression with a rough surface. It looked as if the metal had been poured into an open mould and that some sort of core, heavily weighted, had been pressed down upon the molten metal so as to force it to rise to the exact level of the edge of the mould, or as if whilst the metal was still fluid, or partially so, a portion had been scooped out.

I have been much puzzled to guess how the models for these figures were produced, and whether the wax process was employed. On the whole, I incline to the belief that the models were carved in wood, without any undercutting, and that any necessary projections were fashioned in wax and attached to the wood models. After the completion of the mould the wax could be melted, and the wooden patterns easily withdrawn. A process on this principle was used for casting cannon and bells. I am certain that these statues were cast in one piece, and unless some modification of the wax process was used, we must conclude them to have been piece-moulded, which I think most improbable.

The other two statues, of Richard II and of Anne of Bohemia, show us what progress had been made during the past century. These statues, by Broker and by Prest, were probably cast in 1397. They are fine works of art and excellent castings. They are properly cored, and, although the casting is rather heavy and thick, it is not excessively so.

I have no doubt as to the process here employed. I believe the statues to have been modelled in loam, which was then dried and pared down to form a core. This was then overlaid with a suitable thickness of wax, to represent the bronze statue, and was finished to whatever degree the artist thought requisite. The whole was then moulded in loam and the wax was burned out.

There is one more point to be noticed, that is, that in these statues the hands were cast separately, whereas, in those by Torell they are in one piece. This may be accounted for by another reason than the difficulty of moulding, for the hands of Richard and Anne were clasped, but some thief stole them. The hands were probably added after the statues were finished and placed in position. None of these works are left from the mould, but are chased over and richly gilded.

About a century later William Austen cast in bronze a statue of the Earl of Warwick, still extant.

A few years after Torell had completed his statues in Westminster, Andrea Pisano, one of the most noted of the Italian bronze founders, was born, and in 1330 he completed the models of his chief masterpiece, the bronze gates of the Baptistery at Florence. The casting of these works occupied him for nine years more.

It would be tedious to quote a long list of more or less able founders and their works through all the years of the Italian revival. It will be enough to mention a few of the best known amongst them, as Ghiberti, Donatello, Michael Angelo Buonarotti, John of Bologna, Benvenuto Cellini, etc.

Of Ghiberti, it is sufficient to say that he was a most famous and successful founder. The bronze gates which he made for the Baptistery at Florence are a lasting monument to his fame. Besides these, he modelled and cast the statues of St. John and St. Matthew for the Church of Or San Michele. The Baptistery gates occupied him for nearly fifty years; they were begun in 1403, and the second gate was not finished until about three years before his death in 1455. The wax process was employed for these as for all early Italian bronze work.

Donatello, born about five years later than Ghiberti, was his only rival in the bronze founders' art of that day. For the sake of brevity, I shall only mention a few of his works: — The group of "Judith and Holofernes," which stands in the Loggia dei Lanzi, at Florence; the "David with the Head of Goliath," in the Museo Nazionale, at Florence, and the colossal equestrian statue of "Gattamalata," at Padua. This statue which, although a very fine work, is decidedly inferior to another similar one by Verocchio, seems to have given him much trouble; it was executed between the years 1451 and 1456. At first he began to make a full-sized model of the horse in wood, but he abandoned that plan, and the incomplete wooden model is still to be seen at Padua. It is probable that the work was finally carried out in wax over a loam core, and that the casting was made in several pieces. In 1456 he returned to Florence, where he died ten years later.

The most celebrated pupil of Donatello was Andrea Verocchio, born at Florence in 1432. He executed many works, of which but few remain to us. All that he did in silver has disappeared, and we have only a few bronzes, amongst which is the charming fountain in the court-yard of the Palazzo Vecchio, and the incomparable statue of Bartolomeo Colleoni, at Venice. Apart from its merit as a work of art, the history of this statue is full of interest.

The Signory of Venice do not seem to have behaved very well to Verocchio, at least in the beginning, for after bringing him to Venice to execute this statue they seem to have wished to have his pupil, Vellano, of Padua, joined with him in the work. Verocchio, not unreasonably considering this as a slight on the part of his employers, broke up the head and legs of the horse on which he had been working and fled to Florence. On this the Signory, unable to lay hands on him, published a decree banishing him for ever from Venetian territory under pain of death. Verocchio replied that he would certainly never return, since if they were foolish enough to cut off his head they could neither put it on again nor get another as good, but that he could at any time make a new and a better head for his horse. The Venetians came to the conclusion that he was right about this, for shortly afterwards they rescinded their hasty decree and recalled Verocchio, doubling his pay, and promising that his work should in no way be interfered with. Unfortunately, he did not live to complete it, and at his request the Signory entrusted his pupil, Leopardi, with the task of bringing the work to a conclusion.

It has never been known, and probably never will be known, how much of the work was finished at Verocchio's death. In his will he speaks of it as *Opus equi per me principiati*, making no mention of the rider, from which Perkins concludes, I think rather hastily, that

[1] A paper read before the Society of Arts by Mr. George Simonds and published in the *Journal* of the Society. Continued from No. 1073, page 23.

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he had very little to do with it except as design. Had Perkins been more familiar with the insides of sculptors' studios and foundries, and above all with the colloquial Italian, he would have known that nothing is more usual than for an equestrian statue to be spoken of as "Il Cavallo." I have frequently heard my own Italian assistants in London so speak of the statue of the Duke of Wellington, although there was certainly no doubt about the duke being on the horse's back. In any case it is believed that Leopardi cast the statue and made the pedestal. Verocchio began the horse in 1479 and died in 1488.

We have now reached a period in the history of European bronze casting, when the art was so well understood and so widely diffused that it is quite impossible for me at present to give anything like a complete list of names and to do more would require a volume which I have neither the ability nor the leisure to undertake.

Leonardo da Vinci and Michael Angelo were both engaged on works of the higher order, and although we have no bronze statue left to us by the former, we have much information concerning his great work, the equestrian statue of Francisco Sforza, the sketches and notes concerning which are preserved in the Royal Library at Windsor. We know that for this work he made no less than fourteen designs, and two full-sized models, the first of which did not please him, and the second was never cast, for although it is beyond doubt that the model was nearly, if not entirely, finished, Leonardo was busy at the same time with the fresco of the "Last Supper," and, consequently, put off casting the statue until it was too late. In 1499, Ludovico Sforza was overthrown by Louis XII, who permitted his soldiers wantonly to destroy the model.

Some have thought that the bronze group of "St. John and the Doctors," over the door of the Baptistery at Florence, was in part, at least, his work, but there seems to be but little doubt that it is entirely the work of his friend Rustici.

Michael Angelo himself was also a bronze founder, and once, at least, an unfortunate one, since we find in his letters bitter complaints of his want of success in casting the statue of Pope Julius at Bologna, which he ascribes to his having too confidently entrusted the conduct of the process to a cannon founder instead of attending to it himself. He amended this error, and the second time he cast it successfully, in the year 1508. Three years later it was destroyed by the populace, and melted down to cast cannon.

Of this greatest of sculptors I need say no more, but pass on at once to the lesser men — Torregiano, born 1472, and Rovezzano, probably about the same time. Both of these artists came to England, and were engaged, the former on the tomb of Henry VII, and the latter on a tomb which Cardinal Wolsey had ordered for himself. This tomb was never finished, and all the bronze work about it was melted down by the Commonwealth, after the execution of Charles I. The sarcophagus alone was left, and was, it is said, used to receive the body of Lord Nelson. Considerably younger than these men, having been born in 1500, Benvenuto Cellini, the artist, whose name is most familiar to us all as a bronze founder, appears on the scene, and after this time the accumulations of experience in this art were apparently first reduced to writing; at least, I have found no earlier treatise on bronze casting than a work entitled "*Pirotecnica in dieci Libri*," which contains, amongst other matter, some information on casting. It was published at Venice in 1558. Besides this, there is a most admirable little work by Cellini, called "*Due Trattate*, etc.," published in Florence in 1568, which consists of a series of most admirably written articles on the various processes employed by himself in his profession. This work, which, strange to say, is almost unknown, is of far greater technical value than his autobiography, which contains but little technical information of importance, yet his life has been through many editions, and has been translated into many languages, while the "*Due Trattate*" was, as far as I know, never reprinted until 1852, when a very poor edition was published at Milan. Some years ago I was so fortunate as to obtain a perfect copy of the first edition, and my wife undertook, at my request, the very difficult work of an English translation. This is now finished, and I hope that before long I may be able to arrange for its publication.

About the year 1540 Cellini went to Paris, where he spent five years executing many important works in silver and one in bronze, a relievo known as "The Nymph of Fontainbleau." In the "*Due Trattate*," the method of casting this work is described with much detail. The silver statues were all melted down a few years later. On his return to Florence, he was fortunate enough to receive a commission from Duke Cosimo, in 1545, to model and cast in bronze a statue of Perseus, to be placed in the Loggia dei Lanzi. This work he finished in 1548, casting it in two parts, one being the base with the body of Medusa, and the other the statue of Perseus himself. One of the feet of Perseus did not come, and was added afterwards. It is interesting to know that 300 years later, Clemente Papi, of Florence, made a replica of this celebrated group in bronze at one single casting, which was entirely successful.

(To be continued.)

A LARGE STEEL PLATE. — A steel plate, said to be the longest ever made, has just been turned out by a Stockton (Eng.) iron company. It measures, after shearing, 70′ 8″ x 5′ x 6-10″ in thickness, weighs five-and-a-half tons, and is without a flaw. — *Boston Transcript.*

LONDON PICTURES FROM THE "COMPOSITION" POINT-OF-VIEW.

IN Sir Joshua Reynolds's day, composition was one, if not the principal, element of a picture. That a combination of lines should form an harmonious whole, was as important a matter as that the various tones employed should be welded into a color harmony. But many an artist now thinks no more of harmonious composition than of harmonious coloring; the eye is as often focussed upon some spot up in a corner of the canvas, as it is shocked by a chessboard of tints which are apparently chosen because they, technically speaking, swear at each other. The laws of art, as understood by the ancients, are not observed; and often, for sake of eccentricity and notoriety, they are discarded, or left to be indulged in by the old-fashioned. Mr. Watts is not one of these. Most of his works give us intense pleasure, not only as color and tone studies, or for their exquisite draughtsmanship, but also for their beauty of form and composition. His picture at the Academy, of the "Infancy of Jupiter," is an example of his method, and might, when only studied from the black-and-white reproductions, be taken for a Tintoretto or a Titian by reason of its exquisite refinement of line.

Sir John Millais's "Forerunner" (why not have named it the "Baptist"?) is severe in its repetition of perpendicular lines, broken by the cross the Saint is binding together, thereby intensifying the solemnity of the expression, as becomes the subject. A secular subject, full of dainty grace, is Mr. Solomon's "Birth of Love," a tall, somewhat over-tall female figure encircled by three little Cupids and nebulous drapery.

Mr. Gotch's "Allelina" is a composition after the heart of an early Florentine, but the position of the figures holding scrolls in their hands form an harmonious composition. Mrs. Normand's "Summer" is a graceful nudity, but somewhat suggestive of Cabanel's "Venus rising from the Sea" — the goddess is lying down in much the same attitude.

As an example of a perfectly composed landscape without an atom of conventionality, Mr. Waterlow's "Where early falls the Dew" is exquisitely beautiful. It is well balanced, not crowded, but sufficiently filled with interest by the woman and child, and the group of sheep; above all, it is poetic. The composition of Mr. Dicksee's "Harmony" is imitated by "The Victor vanquished" and, therefore, need not be discussed. An instance of division of interest may be seen in Mr. Gloag's "Miracle of the Roses." The eye should be centered upon the Saint's face and the supporting angel behind the stake; but down below, close to the frame, some heads unpleasantly divide the interest. "The Waning Light," by Mr. C. Eastlake, is a scrap of Holland or Belgium, with uprights (trees) and horizontals — banks and cottage roofs. It is quaint, but cannot be called graceful, and with equal truth some of the lines might have been broken, or the hill-line raised at one side. M. Caffieri's "Children Bathing" is, on the other hand, full of grace — the composition being that of a triangle.

The "Burial of St. Catherine" is scarcely new in composition — many painters having done it, and the apotheosis of Marguerite in Gounod's "Faust" has made it as familiar to us as any household god.

Mr. Hacker's "Cloister and the World" is a triangular composition dealing in perpendiculars — that is to say, the triangle stands on its apex. Turning to Mr. Wyllie's "Silent Highway," we find another perfect composition: "St. Maria della Salute" is the keynote; a procession of gondolas float away to the right; one gives the balance on the left. Very beautiful, also, is Mr. Edward Stote's "Golden Moon," and likewise Mr. Walter Crane's "Rainbow and the Wave." These are examples of the simplest but the most graceful compositions, as well as teeming with poetic feeling. In character, "Blinded by Love" is almost a Henner, but it is Mrs. H. M. Stanley's contribution.

The question as to whether action is paintable may be answered by Mr. G. Gascoyne's "Field Labour," at the New English Art Club, and probably by most people in the negative. Who does not remember the "Atalanta" by the late President of the Royal Academy? and who, remembering it, has forgotten its failure as a decorative work? Momentary action cannot be a happy subject to live with. True, the passing cloud and the raging sea do not offend us, but violent action in a human being, or an animal (in a less degree, possibly), forms an unquiet and disagreeable subject for art. Here, in Mr. Gascoyne's picture, we see a man in the act of throwing earth off his fork, with a distant view of horses ploughing (cut off by the hill which obscures their legs), which is hardly happy in composition, but it is "new," as the drapers say. The "Adoration of the Three Kings" is one of the few religious pictures which tell their errand, and in composition it is pleasing. The Blessed Virgin sits in a shed, and between her and a standing king is an open window showing a snowy landscape. Opposite the Holy Mother kneels another of the Magi, St. Joseph and the third king forming pendants at each side.

It is curious that a nation which is decidedly of a religious turn of mind, should care so little for religious pictures. The new development of that branch of art, which has so stirred the heart of French painters, has made but little mark here; and when such works are hung upon our walls, the public takes but little heed of them. Hence, Mr. Hitchcock finds but few admirers beyond artists, and art amateurs; and yet, what poetic, what consummate art his is!

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Decorative art, as such, finds but few votaries in this country; and anything like the grand style of M. Puvis de Chavannes is unknown. When a public building has to be decorated, we place what might be framed pictures upon the walls; indeed, all art here in England is too little decorative. Even small pictures should be painted to look well upon a wall, not as a miniature to handle; but certainly a large work, to cover a large space, should be more so. The painters of the Renaissance in Italy understood this, and some of the modern Frenchmen understand it — indeed, one may truly say that Puvis de Chavannes, Maignan, Montenard and others form a new and Christian Renaissance as regards decorative art.

The Japanese set us a grand example, for nowhere under the sun is decorative art understood as in Japan; but whether we shall go on in our own way, whether we shall learn of Japan, or whether Japan will be perverted by Europe, is a question to be solved only in the future.

S. Beale.

Illustrations

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE MARTIN BUILDING, ST. LOUIS, MO. MR. GEORGE R. MANN, ARCHITECT, ST. LOUIS, MO.

[Gelatine Print, issued with the International and Imperial Editions only.]

LINCOLN SCHOOL-HOUSE, EVANSTON, ILL. MESSRS. J. T. W. JENNINGS & H. J. ROSS, ARCHITECTS, CHICAGO, ILL.

This structure, now building at the corner of Forest and Main Sts., is to cost about $50,000.

BEREAN BAPTIST CHURCH, READING, PA. MR. J. M. MACQUEEN, ARCHITECT, HARRISBURG, PA.

PROPOSED HOUSE, ENGLEWOOD, N. J. MESSRS. MOWRAY & UFFINGER, ARCHITECTS, NEW YORK, N. Y.

DESIGN FOR A FOUR-ROOM SCHOOL-HOUSE ON BOYLSTON ST., BROOKLINE, MASS. MR. W. ATKINSON, ARCHITECT, BOSTON, MASS.

TWO COMPETITIVE DESIGNS FOR GRAMMAR SCHOOL-HOUSES, MELROSE, MASS. MR. G. H. INGRAHAM, ARCHITECT, BOSTON, MASS.

ACCEPTED DESIGN FOR HIGH SCHOOL-HOUSE, MELROSE, MASS. MR. CHARLES BRIGHAM, ARCHITECT, BOSTON, MASS.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXIII: FOUNTAIN OF ST. GEORGE, CANNES, FRANCE.

PAINTED FRIEZES, ROME.

A GROUP OF SUBURBAN CHURCHES.

[Additional Illustrations in the International Edition.]

THE PORTICO OF THE FRAUENKIRCHE, COPENHAGEN, DENMARK. CHRISTIAN FREDERIK HANSEN, ARCHITECT.

[Gelatine Print.]

The old wooden church which is mentioned as existing early in the twelfth century was replaced about 1316 by a great stone edifice with high tower and spire. By a fire which, in 1728, destroyed the greater part of the town this church was also destroyed; but soon after, 1731–38, it was rebuilt in the same style by King Christian VI; the richly gilded spire, 394 feet high, so that it was visible within a radius of six miles, and prized as one of the highest and most sumptuous in all Europe, was added in 1741–45 after the design of G. V. Lerche. But, alas, this noble and famous church in its turn came to the ground. During the bombardment of Copenhagen by the English fleet in 1807, the tower was set afire by a congreve rocket and the church was consumed. Christian Frederik Hansen, to whom the work of rebuilding was entrusted, influenced by the scantiness of funds and his own predilection for the antique, designed the building in the Roman style. The work of rebuilding continued between 1811–29. The sides and choir end are devoid of all ornamentation, but the front and tower are carefully membered, although there is no rightful connection between the general style of the building and the Grecian Doric entrance porch.

The interior shows a nave terminating in a semicircular apse and around the two sides and front end run galleries, with great Doric columns supporting the barrel vault over the nave. This interior is impressive, restful and strong with religious suggestiveness.

The pediment over the entrance porch is decorated with a group in white marble — now somewhat time-stained — representing John the Baptist preaching in the wilderness. Upon either side of the nave within, stand statues of the twelve apostles, while the font in front of the altar is in the form of a kneeling angel holding a scallop-shell in her arms. Behind the altar, in a pedimented niche, stands the famous statue of the Saviour; all these figures are carved in white marble. Above, on the wall of the apse runs a marble frieze showing in relief the march to Golgotha; this frieze, two small reliefs on the outside and the frieze in the vestibule which represents Christ's entrance into Jerusalem, are the work of the sculptor Thorwaldsen. The bronze figure of Moses at one side of the entrance porch was modelled in 1859 by H. V. Bissen, while the corresponding figure of David, set up in 1861, is the work of the sculptor J. A. Jerichau.

INTERIOR OF THE SAME CHURCH.

[Gelatine Print.]

NO. 24 WIGMORE STREET, LONDON, ENG. MR. C. H. WORLEY, ARCHITECT.

Communications

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

WHAT IS A PORTE-COCHÈRE?

To the Editors of the American Architect: —

Dear Sirs, — According to common usage in this country it would seem to be a carriage-shelter outside the building proper; a porch through which a carriage passes without entering within the walls of the building. This corresponds more nearly to what the French call a *descente à couvert*, and is not in any sense a porte-cochère, which I understand to be a doorway to admit vehicles to a court or passage within a building.

Would we not more properly call these external shelters carriage-porches?

W. E. Chamberlin.

[Our correspondent is unquestionably right, and architects may do a little something to correct this misuse of a foreign term, by properly lettering their own drawings. — Eds. American Architect.]

Notes and Clippings

To Preserve the California Mission Buildings. — Mrs. Jessie Benton Fremont is a member of the advisory board of the Landmarks Club, an organization formed at Los Angeles a few months ago, for the preservation and restoration of the old Mission buildings and other relics as monuments and landmarks. The club is now engaged in restoring the historical Mission of San Juan Capistrano the most beautiful and elaborate church of those built by the Franciscan Fathers. — *Boston Transcript.*

Japanese Garden in America. — A miniature garden, 15 by 13 feet, representing a district in Arashi-Yama, west of Saikyo, the ancient capital of Japan, is being laid out upon the lawn of John H. A. Klauder's residence in Philadelphia. The garden, which is being arranged under the supervision of the Japanese artist, Teitoku Morimoto, is filled with miniature Japanese buildings, which represent a Buddhist temple, with its group of eight structures and its arch, or torii, and its toro lanterns. On the southwest corner of the garden is a representative of a Shinto temple, with its group of buildings, torii and toros. From the summit of Arashi-Yama is a waterfall and cascade, which is supplied from an inch pipe. The water tumbles down the rocky mountain side, and in one place represents a celebrated falls, known as Shiraeto-no Taki, or white thread, and flows into the Katsura River, in which there are a number of islands, and a representative of what is known as the shifting island. The river itself is a series of rapids. — *Philadelphia Record.*

Frosting Glass. — The late Mr. Gibson, of Broadway and Thirteenth Street, New York, was the originator of the above mode of ornamenting glass. It was practised by him some fifteen years ago. The varnish referred to consists of glue. A new sort of ornamental glass is now made in Paris by M. Bay, which he calls by the name of hoar-frost glass, "*verre givré*," from the pattern upon it, which resembles the feathery forms traced by frost on the inside of windows in cold weather. The process of making the glass is simple. The surface is first ground, either by the sand blast or the ordinary method, and is then covered with a sort of varnish. On being dried, either in the sun or by artificial heat, the varnish contracts strongly, taking with it the particles of glass to which it adheres; and as the contraction takes place along definite lines, the pattern produced by the removal of the particles of glass resembles very closely the branching crystals of frost-work. The pattern may be varied in character by changing the thickness of the film of varnish. A single coat gives a small, delicate effect, while a thick film, formed by putting on two, three or more coats, contracts so strongly as to produce a large and bold design. By using colored glass a pattern in half-tint may be made on the colored ground, and after decorating white glass the back may be silvered or gilded. — *Illustrated Carpenter and Builder.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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THERE is a prospect of serious trouble in the building-world of Boston. Every member of that world knows that buildings are often erected in violation of the building-laws, by the simple process of making the plans and specifications to conform to the law, taking out a permit in pursuance of them, and then carrying out the structure without regard to the approved plans, or making such alterations as to constitute violations of the law. The force of inspectors in the city is very small, and no vigilance on their part can wholly prevent this sort of evasion of the statutes, although the Department, which is quite aware of the evil, is particularly strict in looking after such cases. After the building is finished, the owners generally think themselves safe from harm, but Mayor Quincy, who is a firm believer in the doctrine that laws are made to be executed, is said to have determined to prosecute violations of the statute in completed buildings; and, with the assistance of the inspectors of the Building Department, who have reported something like one hundred and fifty cases of the kind, to be preparing for energetic proceedings. The principal difficulty about the matter is that the worst offenders are irresponsible speculators, who engage in extensive building-operations on a very small capital, borrowing the necessary money on first, second and often third mortgages, at rates of interest proportionate to the risk. As their chance of profit lies in building cheaply, their interest is to evade the law wherever obedience to it is more expensive than disobedience. In any case, their equity is very small. A certain builder is said to have bought land, and put up houses, in one operation, to the value of something like four hundred thousand dollars, on a capital of five hundred dollars. To such a man, the loss of his share of the investment is not very serious. The builders of this class, if complaint is made against them for violation of the law, usually transfer their title to some friend, and then explain that, having sold the property, they have no further liability in connection with it. If the complaint should be pressed, and the alteration of the building to comply with the law enforced, the owner, if the alteration promises to be too expensive for his means, has simply to abandon the property to the mortgagees, go through bankruptcy, and start on a fresh speculation; while the holders of the junior mortgages may find themselves confronted with the alternative of spending a large amount of money, on which they are unlikely to get any return, or of losing their investment entirely. For this reason, it is proposed by people interested in lending money for the improvement of real estate, to have their mortgages drawn in future with a clause providing that the buildings to be erected with their money shall comply with the law, and making non-compliance a breach of the mortgage agreement. This would enable the mortgagee to refuse to make payments until it should be definitely ascertained that the work complied with the statute, and would entitle him to foreclose at once on proof of non-compliance. Whether this plan will be adopted remains to be seen, but there would be some difficulties in the way of reducing it to practice; and, meanwhile, some of the people with whose money building has been done within the past three years are likely to suffer both inconvenience and loss.

THE way in which political movements affect, to a greater or less extent, every citizen's affairs is strikingly shown in a quiet suggestion, made by a committee of the National Association of Master Builders, that it might be well for the approaching Convention of the Association to discuss the propriety of amending the Uniform Contract, so as to have it provide that all payments under it shall be made "in gold coin of the United States, of the present standard of weight and fineness." Thousands of leases, mortgages and promissory notes, particularly in the West, now contain this stipulation. It is said that the salmon-canners of the Pacific Coast, in making contracts for the delivery, next October, of this season's fish, require their customers to agree to make payment in standard gold coin; and, if this is a proper precaution for the salmon-fishers to take against financial perturbations two months hence, the builders, whose contracts usually extend over a period of at least a year, and often much more, could certainly not be accused of a lack of patriotism if they should decide to make provision in a similar way for fixing the value of the money to be paid them for their work and materials. In fact, with a powerful political party committed to the plan of raising prices by increasing the quantity of money in circulation, it is obvious that builders, who, as the work on their contracts goes on, would find themselves, under the operation of this plan, compelled to pay constantly higher wages, and higher prices for their materials, while, at the completion of their agreement, they would receive only the sum agreed upon in conformity with the low scale of prices current a year or more previously, will invite speedy ruin unless they can devise some way of assuring themselves that the value of the price to be paid for their work and materials will bear nearly the same relation to the cost of such work and materials at the completion of the contract that it did at the beginning; and in providing for such assurance, by specifying the standard of value on which the contract shall be based, they simply put themselves on an equality with the retail merchant, who, in buying from week to week at advancing prices, reimburses himself immediately by increasing his own prices, or with the working-man, who, as the cost of living increases, demands higher wages to enable himself to pay it.

ANOTHER reason in favor of prudent action by the associated builders at this time is to be found in the fact that they are not only more exposed than any other people to the losses incident to variations in the standard of value during the period required for the fulfilment of their contracts, but that the introduction of "Mexican prices" would probably lead to a great deal of building. The change from gold prices to Mexican prices would be gradual, as it would take some time to settle the actual ratio between the two, and, as a great intellect is not needed to perceive that the operation of contracting for a house at or near gold prices, and paying for it, at the end of a year or two, in Mexican dollars, is, financially, a very advantageous one for the owner, thousands of people would embark in building speculations, which, owing to the long interval between the making of the agreement and the payment of the contract price, offer, under a system of gradual Mexicanization of prices, greater profit, with less risk, than any others. A moment's consideration will, however, show that the owner's profits are taken out of the pocket of the contractor, who has had to give gold value for what the owner pays for, at the completion of the building, at the Mexican standard. At present, the necessary protection of the builder's interest may, apparently, be secured by the simple substitution in the Uniform Contract of the words "standard gold coin," in place of "lawful money" or "current funds." Later, it might be more difficult to make the change, by reason of complications arising from legislation designed to carry out the

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declaration of the Democratic platform in favor of prohibiting the making of contracts payable in any particular sort of money. A statute making it a penal offence to stipulate for payment in gold for one's goods or services would bear much more hardly on builders than on salmon-fishers; and if the former wish to establish a standard of value for their contracts, it is decidedly advisable to do so now.

A DISCUSSION is going on in the *Engineering Record* in regard to the first invention of the steel-cage construction now so much employed for high buildings in this country. It is hardly necessary to say that Mr. W. L. B. Jenney, of Chicago, has long been accorded, by general repute in the profession, the honor of having been the first to use this construction in an entire building, the Home Insurance Building, in Chicago, having been designed by him in 1883, with piers of cast-iron columns, encased in masonry, and carrying a flooring of steel beams, the first steel beams, by the way, ever used in a building in the United States. This use of cased metal piers was devised by Mr. Jenney to meet the problem which every office-building presents, of reducing the piers, and enlarging the openings, to the extreme limit consistent with safety, and he appears to have been indisputably the first to employ for this purpose the system which has since then been developed with such wonderful rapidity. The mere use of metal and masonry together in walls dates, however, much farther back than 1883. Mr. George B. Post, as he reminds the *Engineering Record*, built, in 1881, the court-yard wall of the Produce Exchange, in New York, with a cage of cast-iron columns and wrought-iron girders, filled-in with brick panels; and, if we are not mistaken, it was a year or two before this that a house was built in Paris, and illustrated in the French professional journals, the street wall of which consisted of an iron frame, put together in imitation of the old English and German half-timbered work, filled-in with panels of brickwork. In this case the iron skeleton was exposed to view; and, in general, the conception of the mixed constructions of metal and masonry, which were not uncommon fifteen or twenty years ago in railway buildings, theatres and other structures where lightness and wide spaces had to be reconciled with fireproof quality, seems to have regarded the masonry as a mere panel-filling, or, occasionally, a screen. Mr. Jenney's idea was altogether different. He, virtually, designed an iron building, not very different from scores of mercantile structures of that period in New York, and clothed it with an epidermis of masonry. This was an innovation, and, as it has been proved, a most valuable one; and while we are glad that Mr. Jenney did not patent his device, as, it seems, he thought of doing, he ought to have all the credit that he deserves for it.

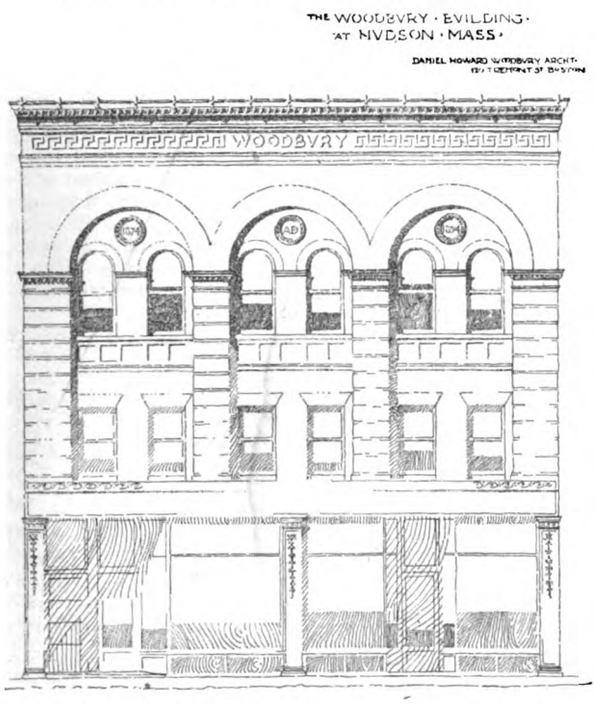
AN instructive case, showing not only the way in which the powers of the architect are defined by the contract, but the strictness with which the parties to the contract are bound by the authority that they have agreed to delegate to him, is briefly mentioned in the English papers. A man named Kenworthy had a mercantile building erected under the direction of an architect. The contract with the builders stipulated that, in the case of extra work, the architect should measure and value the work, and should give his certificate for payment; and another clause specified that in cases of disputes arising between Kenworthy, or the architect, and the contractors, and not otherwise provided for, an arbitrator, to be mutually agreed upon, should decide. The contract price amounted to nearly seventy thousand dollars, and when the work was completed, the contractors claimed about eight thousand dollars for extra work, besides twelve hundred and fifty more as damages for delays on the part of the architect and the brickmaker. The architect threw out these claims, and gave his certificate only for a balance of about fifteen hundred dollars. The contractors thereupon demanded an arbitration, and, as Kenworthy refused to concur in appointing one, they applied to the courts to appoint one. The first court held that, under the contract, they were not entitled to one, and refused to make the appointment, and they appealed to the Court of Appeal, the justices of which sustained the ruling of the court below, saying that the question was whether the matter to which the dispute related was provided for by the stipulations of the contract. In their opinion, the contract meant that the architect should measure and value extra work, and give his certificate for payment, and the contractors were not entitled, under this clause, to substitute an arbitration for the architect's decision.

IT will be remembered that some time ago, after the death of Ferdinand de Lesseps, it was reported that the real author of the scheme for the Suez Canal was an Austrian engineer, whose plans de Lesseps, who had already become interested in the proposed undertaking, bought for a low price, after the death of their author, and used as his own. The Austrian *Monatschrift für den Öffentlichen Baudienst* gives some further particulars of the story, which are interesting. It seems that the Austrian engineer whose plans were bought by de Lesseps was a Tyrolese, named Negrelli, who was born in 1789, at Primiero, in Southern Tyrol, of a distinguished family. He was educated at home, and in Italy, and in 1819 was already attached to the official engineering staff for Tyrol and Vorarlberg, and was engaged in the topographical survey of the valley of the Inn, and the construction of the Schönbergerstrasse in that valley. Later, he was sent south of the Alps, to study the regulation of the overflows of the Adige, and, in 1822, was one of the chief engineers of the great Arlberg highway. His reputation increased rapidly, and, in 1832, he was called to Switzerland, where, first as engineer to the Canton of St. Gall, and afterwards to that of Zurich, he carried out very important works. In 1840, he was summoned back to Austria, to take charge of the construction of the new Ferdinand-Railway. A little later, he was given the general direction of all railway works in the northern part of the Empire, and, after successfully planning a system of roads, he was called to lay out the railways for the Kingdom of Wurtemberg. In 1848 he was sent to Italy, to restore the railways and other communications disturbed during the political troubles of the time. In this work he was so successful that he was ennobled, under the title of Ritter von Moldelbe.

IN 1846, the question of a canal across the Isthmus of Suez had come up as a matter of international politics, and an Association for the study of the engineering problem was formed, at the instance of the Ministers Metternich and Kübeck. Negrelli had, some eight years before, interested himself in the subject, and was made a member of the new Association, as was also the Englishman, Stephenson, and the French Talabot. The next year, he went to Egypt to study the route of the canal, and levelled it through, ascertaining that, with the exception of local variations in the Arabian Gulf, the waters of the Red Sea and the Mediterranean stood at the same height. His mission to Italy interrupted his Egyptian studies, and it was not until 1855 that he was able to make a second visit to Egypt, and study the details of his plan, which was for a sea-level canal, as distinguished from the schemes proposed by his colleagues, which contemplated locks, and, in a weekly journal, the *Austria*, during the year 1856, he presented his views, which accorded very closely with the plan afterwards carried out. In June of the same year, a Commission met in Paris, in which, after long discussion, Negrelli's plan was unanimously adopted. Two years later, he received from the Viceroy of Egypt, Saïd-Pasha, the appointment of Inspector-General of the Suez-Canal Works. He was, however, already in failing health, and in October of the same year he died. A few months later, his plans, maps and notes were sold by his heirs, and de Lesseps, who held an official position in Egypt, and had interested himself in the Canal project, bought them, and, undoubtedly, used them as his own. He seems to have done so quite innocently, and to have been willing to acknowledge his indebtedness to the great Austrian engineer, for, in a map of the Canal-City of Ismailia, which he dedicated to the Abbé Negrelli, the brother of the engineer, "in remembrance," as the inscription says, "of his excellent and regretted brother, my intimate friend," he shows an important street through the middle of the new town, marked "Rue Negrelli." Even if de Lesseps had been enough of an engineer to modify Negrelli's plans, he would hardly have had time to do so, for work on the Canal was begun in April of the same year in which he bought them, and there can be little question that they were carried out substantially as Negrelli left them. A few years ago, the present representatives of the Negrelli family sued the Canal Company for reimbursement for such rights as they had been deprived of by the transaction. They recovered nothing, and, indeed, it is hard to see on what ground a court could award them anything; but the documents offered in evidence seem to have established clearly that their progenitor, and not de Lesseps, was the real designer of the Suez Canal as it now exists.

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CHURCH ORGANS AND ORGAN-CASES.[1]



THOSE charged with the construction and preservation of church organs are not unfrequently held responsible for certain defects connected with the use of these costly instruments — defects for which they should not be blamed and against which they often contend in vain. We are referring to defects which not only impair the usefulness and musical quality of the organ, but which are also apt to prove injurious to the reputation of the manufacturer and to his monetary interests and those of the church owners as well. In most cases the individual organ-builder finds it impossible to secure the adoption of his recommendations on the part of the architect, or the building-committee; or, prompted by considerations of business sagacity, he refrains from taking a decided stand against existing adverse conditions; or, perhaps, it may be already too late to enforce the proper conditions for the placing of the organ when the organ-builder is approached. In such instances the result is generally unsatisfactory, and blame is thrown on the builder for what could easily have been avoided, if the needs of the organ had been properly studied at the right time.

The Union of German Church Organ Builders, therefore, deems it necessary, in the interest of the art-branch which it represents, to call attention to a few important points by the publication, from time to time, of appropriate articles on the subject. In the following lines, it will be our aim to deal principally with the evils encountered in furnishing organs for *new* church edifices. The primary condition is that, in planning, sufficient floor-space should be assigned to the organ for the proper placing of the pipes. With this condition unfulfilled, the various sets of pipes are often so crowded together as to make access to them in many places difficult. This, again, renders any sort of adjustment or repairing work difficult and costly. Another great disadvantage is that, by crowding the pipes, the production and quality of tone are sure to suffer. In many cases, the size of the organ-loft is determined by the architect, while a musical expert is called to decide upon the number of stops, before the order for the work is given to the organ-builder. The latter, in his endeavor to live up to the specifications, finds himself facing the necessity of deviating from the most approved plan of arranging the pipes and is compelled to make the best of the available space. It is, therefore, to be recommended to architects having the interest of their clients at heart, to obtain the opinion of an expert organ-builder as to how many stops are required in view of the size of the church *before* the planning of the organ-loft, and what length, width and height are needed for their proper arrangement. From these data, to which must be added the needful space for the choir, the size and the elevation of the organ-loft may be determined. It will then be feasible for the organ-builder to arrange the pipes according to an approved system, which, in itself, is a great point gained toward the successful accomplishment of his task. It is also necessary for the architect to inform himself about the weight of the organ and case, to enable him to properly compute the strength of the floor. Perfect rigidity is a requirement of the first importance, the continued trembling of insufficient supports being simply ruinous to an organ.

The question of lighting, too, requires due consideration. Experience teaches that it is best for the organ to receive its light from the front only, viz., through the side windows of the church, so that the inner portions of the instrument may remain pretty well in the dark. Direct sunlight falling on the outside, or the inside, of the organ always proves injurious to it. In recent years, in Germany, the west window (so-called even though its position may not be west at all) has become the fashion again, much to the annoyance of the officiating priest or clergyman, who has to stand at the altar, or in the pulpit, with the glare shining in his eyes. This window in the wall over the front entrance may have been a necessity centuries ago when churches had no organs, or small ones, at best. Then the architect was seeking for a feature to enliven and decorate that large wall-space. Nowadays, when the musical portion occupies an ever-increasing prominence in divine service, this west window is no longer a necessity, but, considered in its effect upon the organ, is a decided evil. The window occupies the space that ought to be given up to the organ. As the architect is not likely to consent to a partial covering of the window, the remaining space below and at the sides of it will in most cases prove insufficient for the advantageous placing of an organ proportioned to the size of the church. Looking upward from the aisle to take in the effect of the organ-prospect, the eye, blinded by the light falling through the great west window, will see nothing except the black upper outline of the organ-case, an effect which must be pronounced an artistic failure. To this must be added the injurious action certain to be caused by the sunlight falling into the organ from behind, even though its intensity be subdued by stained glass. Add, further, the periodical heating of the organ-pipes by the sun, the injurious effect of cold draughts and dampness affecting the delicate mechanism of the instrument, all occasioned by that window. Supposing a pane to be broken by some cause or another, nothing will prevent rain or snow from entering the organ-case. Frequently the broken pane may not be discovered for a long time, yet even when discovered, the mending of the window, on account of its inconvenient position, is often delayed. The window, moreover, during the summer and autumn attracts hosts of flies who make their way into the pipes, where they die, thus spoiling the intonation.

We believe the majority of architects have not the remotest idea of the disadvantages they create for the organ by introducing this favorite window, by which, after all, a satisfactory interior effect cannot be obtained for reasons explained before. To the contrary, this window brings into view the larger wooden pipes and the big swell-boxes which ought to be hidden from sight, but which the organ-builder finds impossible to place where they will not show, and thus the artistic effect of the organ-case is marred.

To dry a new church-building rapidly, coke fires are often employed in Germany. So long as the organ has not been placed in the church, no objection can be raised against this practice. With the organ, however, in position, the action of the gases issuing from the coke fires is pernicious. The tin pipes become tarnished and blackened, the brass bolts and pins, wires, springs, etc., become oxidized and so brittle as to break at a mere touch. An organ injured in this manner requires very extensive repairs to render it useful again.

In some cases, the expedient of washing the tile floor of a church with diluted muriatic acid has been the cause of blackening the highly-polished front pipes[2] of a new organ, giving them, in a few days, the ugly appearance of lead, which cannot be undone by a simple rubbing, but requires a thorough abrasion of the surface and renewed polishing to restore the pipes to their original bright appearance. The employment of injurious chemicals for cleaning purposes is, therefore, a thing to be avoided.

Not less important than the proper erection of the organ is the preservation of the same. We will, therefore, state the most important causes which, being more or less permanent, may work injury to the organ. Where churches are heated by gas-stoves without the needed provision for carrying off the fumes of combustion, or where the church is lighted by gas-jets, a certain injurious effect upon the organ-pipes similar to that caused by the coke fires, though less pronounced, will be noticed. Heating the building, as a general thing, unless continued throughout the week, has the effect of putting the organ out of tune. The front and smaller interior pipes become heated first and thereby higher in pitch, while the larger wooden pipes become warm more slowly and do not rise in pitch until after a lapse of eight to sixteen hours. The warming up of the inner pipes may, however, be hurried up by furnishing the case with open-work panels, which may be inserted during the winter months in place of the solid panels which are preferable in summer on account of better keeping out the dust. To obviate the difficulty of inequality of pitch, it is recommended to start the heating of the building from eight to twelve hours before the beginning of the service.

One of the worst enemies of organs to guard against is dampness. This is especially noticeable in the spring. In much frequented churches, the exhalations issuing from the crowded assemblage, unless carried off by proper means of ventilation, are deposited along the ceiling and on the walls and pillars of the edifice. Often streams of water may be seen trickling down the walls, or the water may drip from the ceiling. In winter, still larger quantities of water are deposited on walls and ceiling by freezing on, only to thaw, at the rise of temperature, and make every object inside the church, the

[1] Translated by F. G. Lippert from a paper prepared by order of the Union of German Church Organ Builders, and published in the *Deutsche Bauzeitung* of Berlin.

[2] It may be here stated, by way of explanation, that in Germany preference is given to a plain, but highly polished, metallic surface over the multicolor decorative treatment generally employed on the front pipes of church organs in this country.

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organ included, dripping with moisture. Wherever in a closed space the atmosphere is full of moisture in conjunction with foul air, the building materials will rot in a comparatively short time: woodwork falls an easy prey to worms, leather is covered by mouldy growth, the glue holding the parts together decays. The mechanism of the organ, owing to the swelling of leather and woodwork and the oxidizing of the metallic parts, becomes impaired and refuses to work smoothly. The wind slots of the wooden pipes become contracted, re-acting unfavorably upon intonation and harmonic quality. The most carefully-made piano, put in such a place, would in a few weeks become totally unfit for use. There are cases on record of new churches in which, after one year's usage, dry-rot was found to have attacked the pews and other woodwork, so requiring their partial renewal. It is true that, in constructing organs, the manufacturer, being familiar with the harmful effect of dampness, does observe every possible precaution to impart to the organ a considerable degree of resistance in this direction. An organ may, by conscientious painstaking, be brought to perform its functions well, in spite of prevailing dampness. But, unfortunately, the latter condition is by no means permanent, alternating in the summer months with a drying-out process almost as harmful. In some localities where rain is scarce for months at a time, organs known to be a hundred years old and over, have been observed to become so dried up during some of the recent dry summers that they utterly refused to work. The main source of harm, then, lies in the alternation of dampness and dryness.

To combat these evils effectively, there is but one way open, viz: to provide an effective, constantly-working system of ventilation. This may be arranged in various ways. We recommend the following on account of its simplicity: All around the outer walls of the building, about ten feet apart, through the walls are cut circular openings of six inches diameter, covered on the outside by a wire netting to keep cats, rats and mice from getting in, and closed on the inside by turned wooden stoppers fastened to chains. These stoppers serve to close the openings during divine service, thus preventing draughts. In their stead, slides, or registers, the same as for hot-air flues in heating houses, may be used. Through these openings fresh outside air is constantly introduced into the church. The ceiling should be provided with a few large circular openings covered with open-work metallic rosettes (of hammered zinc plate) of twenty-four to thirty-two inches diameter, through which the ropes holding up the chandeliers may be conveniently passed. Avoid placing any openings right above the organ, or anywhere near it. Also avoid having any doors behind, or near it, through which a draught of air might be generated. The organ must stand out of all draughts. Above each rosette a wooden lid, raised like a table on four legs about one foot high above the opening, is then placed in the loft, as a safeguard for workmen against stepping through the opening. In the roof, ample provision must be made for carrying off the air rising through the rosettes, either by open dormer windows, or inserted hollow roof-tiles, or, by conducting the foul air into the church steeple from which it may escape into the outer air. It is obvious that the combined area of the outgoing air-ducts must equal that of the openings in the ceiling as well as the wall-openings at the base of the church.

If you provide a new church with this simple ventilating apparatus, you may safely erect your organ even before the church walls have become perfectly dry. In a church not so provided, it is safer to wait a full year before erecting the organ, as the latter is exposed to greater injury during the first year in a new church not perfectly dried out than in the following ten years combined. It is greatly to be recommended, and will richly pay for the expense, to introduce this method of ventilation into old church buildings also.

The organ should also be protected from the attacks of birds, mice and others of the smaller animals which may work injury either by leaving their dirt behind, or by eating away the leather and woodwork. Bats seem to have a preference for the bright metallic pipes, leaving behind corrosive spots which, once dried up, can only be removed by abrading the surface. Bats and birds are also apt to get into the pipes and sound-cups of the reeds, where they are caught and perish. Not only do the pipes thus choked up become useless, but upon the decaying bodies worms will feed and, in multiplying, find their way into the bellows and valves, causing trouble wherever they reach.

Finally, dust, small particles of plaster and grains of sand dropping from the ceiling, as well as undue vibrations of the gallery-floor, act injuriously upon the musical quality of the organ. To guard against the flying dust raised in sweeping the church, the use of damp sawdust thrown upon the floor of the church and galleries before the sweeping may be recommended.

That a leaky church roof will in time work injury to the organ is too obvious to need more than mentioning.

A church organ is a very complicated instrument, composed of thousands of small parts and a number of different materials, which in the nature of things must gradually wear out and therefore require, at regular intervals, careful and intelligent inspection. There are organs which have not felt the touch of an expert hand for many years, but this is poor economy. One pipe after another refuses to respond, intonation and harmonic effect become gradually more and more deficient. One stop has to come to the support of another, until finally the organist has to give up playing in despair. To play upon such a worn-out instrument during divine service constitutes, in our opinion, an offence against the good musical taste of the congregation obliged to listen to the performance, Sunday after Sunday. The regular listeners gradually get so accustomed to the defects of the worn-out organ that their musical perception becomes dulled and corrupted, while to an outsider the defects in the instrument are at once noticeable.

We, therefore, emphatically recommend to the church authorities, governing-boards and trustees to intrust, against a fixed remuneration, their organs to the charge of an expert organ-builder who shall carefully examine them once, or twice, a year, or at least, once in two years, adjust the mechanism and tune the pipes. In doing this he will have frequent opportunities to discover, and bring to the attention of the authorities, any drawbacks and defects, and to nip in the bud any dangers that may threaten the costly instrument, thereby often saving the expense of extensive repairs.



A NEW MUSEUM BUILDING FOR CHICAGO UNIVERSITY. — THE QUADRANGLE CLUB AND ITS CLUB-HOUSE. — COLONIAL WORK. — NEW CHURCHES. — THE ART INSTITUTE EXHIBITION. — THE GROWTH OF THE INSTITUTE.

DURING this last month still another new building has been completed and dedicated in the group of buildings for the Chicago University, which will eventually form the quadrangle or enclosed space of the college grounds proper. This last structure is the Haskill Museum for Oriental study and curiosities. Like all the other buildings, which have all been designed by Mr. Henry Ives Cobb, this Haskill Museum is designed in a modernized English Gothic and built of buff Bedford stone with red tile roof. The outline is less strictly characteristic of the prevailing style than are those of some of the other buildings of the same group, and the solid unbroken outline of the structure seems also to offer less picturesque points than do the more irregular, more characteristically English ones. The structure is fireproof and is, so far as a casual observer can judge, a solid, satisfactory construction as viewed from the practical side. That all four doors of the entrances open into the hall rather than out, contrary to the laws of the State of Illinois, seems a little curious. It seems a pity that in interior finish the design of the exterior could not be a little more thoroughly carried out. A certain attempt at Gothic feeling appears to have been essayed in the stairs and banisters, but an inglorious defeat is heralded by the newel-post, a small monument to inartistic originality. This same adventurous spirit breathes forth in the capitals of four pilasters of this entrance-hall, where the heads of American eagles are made doubtful features to combine with the star, presumably of crescent intimacy. Lecture-rooms occupy the chief space of the building, while two large rooms in the upper story are designed for museums of Eastern curios, connected with the religious and domestic life of the people of the Orient.

Already, the foundations for two other new structures are being put in place, and before very long the number of buildings will be such as to suggest the whole group as it is planned. Certainly in America no collection of college buildings will in any way compare with this, worked out as a whole and each one placed according to a well studied plan, as to the effect they will have on each other, and on the whole scheme. The grounds as yet are in a somewhat chaotic condition and are poorly kept up, but the near prospect of frequent building doubtless reduces the interest in the grounds at present to a minimum, but presumably the landscape-gardening question has already been taken into consideration, in the general scheme of placing the buildings, and will eventually be well carried-out. It might seem questionable how wise it is to put off the matter of tree-planting, which must be an important feature in transforming this desolate prairie into a spot where the paths of learning will fall in pleasant places. It is a delight that such a pleasant scheme has been conceived, and that the fine buildings are not to be placed haphazard, one lessening the effect of the other and a combination of several styles lessening the general harmony of the whole.

Chicago, heretofore, has been the scene of so many very large undertakings, million-dollar sky-scrapers, World's Fair buildings, great hotels, etc., that at present, in a dull season, we feel as if but little work were going on, hardly realizing, till we actually begin to look at the matter systematically, that in the houses and semi-public buildings recently put up, or still in the process of erection, some of the best and most artistic work of the whole city is to be found. For the present in these letters we shall review this work, which during the last year has been going on, on the three different sides of the city. As is very natural, a steady growth has set in around the vicinity of the University. Churches from farther up town have bought property in this neighborhood and are preparing to erect new edifices down here, for not only has the college settlement

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brought many new people into this quarter, but the desire to combine the attractions of city and country is sending many people from the more crowded up-town districts into those places of greater freedom and greater sunshine.

Just to the east of what will eventually be the college grounds proper is situated the Quadrangle Club-house, a club composed chiefly of the professors connected with the Institute. The Club has just settled in its new quarters. As if to offset the prevalent English style within the grounds, this structure, as well as several others, shows a revival of the old Colonial, which at least speaks well for patriotism and in some instances for a love of the beautiful, for the so-called Colonial can be either a thing of extreme beauty or something devoid of all semblance of it. Many of our forefathers builded just as well as they were able, or as well as they knew how. Their material was often the coarsest, the architectural detail heavy and clumsy, such as the village carpenter could best design and execute, but they built just what their needs required, a broad, roomy house, often surmounted with a little cupola or lookout from which they could watch the approach of foe or friend by land or sea. It was all genuine, unaffected, and finally by that "ceaseless turning of that mill of time, that never for an hour stands still," a new dignity has been added, till finally we hold the least attractive of those structures, something that is truly admirable. The house of the Quadrangle Club hardly belongs to this type of Colonial architecture. Placed, as it is, on a western prairie, no protecting trees sheltering it, it presents to the gaze all the undesirable and but few of the desirable points of the old Colonial mansion. It is built of a coarse, red brick, laid in white mortar. The white ornamental details are heavy and ungraceful, and the entrance, only a few feet from the street, is devoid of almost every architectural feature. The structure is surmounted by a small white pepper-box outlook, neither the beauty nor use of which is apparent to the average mortal, though perhaps the Club members, as being men of unusual wit and intellect, might be able to tell why it was put there. If it were not for the association we Americans have with this certain type of Colonial, few among us could find aught to admire in it. To a foreigner, in whose judgment there entered no tender memories "of the days o' auld Lang Syne," there would seem to be possible but one verdict.

Several of the houses in the near neighborhood have less of the homely element about them, while several blocks farther north a most beautiful new Colonial residence brings up before us all the charm which some of these old houses did possess, when possibly a Bulfinch designed them, and an owner's purse was long enough to permit of sending across the sea for such fine material as the new country did not possess. This house on the corner of Wood Lawn Avenue and Fiftieth Street is simply charming. Built of fine buff brick and harmonizing red-slate roof, the best features of the old Colonial are preserved, while modern taste has added much — the more ample porches, and a certain luxury of appointment which was foreign to the old Puritan sense of propriety, albeit they may have liked such things. In this house the most beautiful type of the Colonial is taken for an inspiration and improved upon, in accordance with existing conditions, since why should the limitations of our forefathers be copied, when such limitations no longer actually exist? The impression given is one of unaffected beauty and elegance: nothing strained; no feature magnified out of its right proportions to produce an effect.

In the vicinity of the University is a very successful Italian house now nearing completion. The roof is carried on brackets like many of the old Florentine structures, the details are well carried out, and the general character is pleasing and well-suited to the place. The material is a mellow buff brick, suggesting the sunlight which its prototype would bask in. The house is especially noticeable from its almost total absence of carving, its entire charm consisting of beauty of proportions and harmony of color.

One of the Unitarian churches from farther north begins this summer in this immediate neighborhood a chapel, to which the entire church is eventually to be added. It is a memorial chapel, which is to be presented to the church, the Church of the Messiah.

A Congregational parish has its new structure, from designs of Pond & Pond, well under way, about a block away from the Unitarian site. This structure is noticeable in its strong individuality and distinct removal from the commonplace, though possibly its entire good taste might be questioned. The materials are a variegated brownstone combined with a brown brick. The brickwork becomes very striking by having every fourth course accented by a dark, dull, purplish brick. The brickwork around the window-openings carries out this same scheme of color and a dull-green slate roof completes the combination, which is certainly not as inharmonious as the description would indicate. There is a certain ruggedness about the composition which, though departing from school traditions, still preserves one marked feature of Italian mediæval work: its strength is in a manner picturesque and, as stated above, far from being commonplace and characterless. It is the farthest removed, praise be to God, from that so-called "Gothic" sanctuary, so prevalent in our city here, where the devout Christian tries to worship weekly, regardless of architecture and art. The main features of the design are the rose-windows, the arcaded balustrade around the roof, the Renaissance buttresses carrying consoles, combined with the unusually large and effective wall-surfaces.

Not far away, one church blossoms out with an oriel window hanging from a church spire, while the heavy belfry of another is carried on pillars, under which is the chief entrance.

To many, churchly traditions in architecture mean nothing, and the monstrosity that is part club-house, part town-hall, and a wee bit church is to them the nineteenth-century sanctuary in its most successful development. That every artistic and beautiful effect is lost in it, is a very secondary matter. It seems to be a widely accepted opinion that, if in the building of a church every accepted law of good taste is set at naught, every established canon of art is violated, then, on the mere face of it, that church must have broken away from the soul-fettering thoughts of past ages, and stand for advanced ideas and progress. A church can be well designed, its style can be pure and dignified and it can yet meet the requirements of the modern church life of to-day. Nothing can show more plainly than the history of ecclesiastical architecture itself how beautiful may be a style, the result of special needs for special times and occasions. What a contrast between the old basilicas in which the early Christians worshipped and that wonderful creation of the Middle Ages, the Gothic cathedral. And yet, nearly every step was natural and the outcome of either the needs in building or the requirements of the worshippers.

As is said above, in this southern part of Chicago it is interesting to see the growth which is coming, not only with the settlement of the University in this quarter, but with the desire to leave the dirt and noise of the city behind. For many years these once southern suburbs have had a good and steady growth, but with the increasing conveniences in transportation land in this quarter is becoming much more available. Sections which once were considered very far south are now so built up as to present the appearance of regular city streets. The houses in this quarter are detached and their façades seem to offer more than the usual opportunity for architectural flights of the wildest kind. In one narrow city lot we note a gable containing an oval window; underneath, two oriel windows separated by a stained-glass parallelogram; while beneath, two semi-demi Romaresque arches occupy the entire breadth of the house. Nondescript carvings occupy most available spaces, excepting the front steps, which are occupied during this season by a family of all ages and generations, giving a still greater effect of unrest to the exterior.

A very beautiful mansion in this part of the city is a recent creation of the firm of Shepley, Rutan & Coolidge. It is Italian Renaissance in style, of dressed stone and most beautifully carried-out in all its details and carving. It would offer most charming subjects in its different parts for the photographers' art, and could well be considered worthy to be the subject of a monograph. One very beautiful feature is the cornice. This is ornamented with very charmingly carved garlands, alternating with shields bearing the lilies of Florence. Another attractive feature is the loggia on the east façade, with most delicate carving and well-designed wrought-iron balustrade. Not only is the house itself carried-out in the perfect harmony of the chosen style, but the grounds also are laid out in the same excellent taste, even to the iron fence and orange-trees in tubs.

In contrast with this very satisfactory, well-studied creation is a house a few blocks off, belonging to one of our prominent packers, Mr. Armour. There is nothing very faulty about the design, but it just falls short of having the artistic touch of the last-mentioned house. Built in the early French Renaissance style, of brownstone, it does not seem to have the dignity and refinement that might have been obtained with less pretentious material, though the present effect may be due to carving, which certainly was not executed by an educated sculptor, as should have been the case, but rather by an expert stone-cutter. In parts the design is not as strong as might be, but the general composition is well handled. Certainly the details in the carvings, such as the under-cut work around windows, are charming in execution and design, but such work, notwithstanding it is good, is overshadowed by some bad figure-work in an east and north dormer, and some of the same description around the main entrance. In the dormer a poorly executed "Mercury" with a "lady friend" stands prominently forth, and over the doors two very unconventionalized and poorly-drawn little boys sprawl around. All of these faults should be laid at the door of the sculptor rather than on the shoulders of the architect, who evidently was not allowed a workman worthy of the work.

During the last month the Art Institute has held its usual annual exhibition of school work. The general grade of the work is high, showing that the standard of the school has been very materially raised since its early days. Some very strong work is shown in the life classes, both from the nude and costumed models, and in fact excellent work is to be seen in all the grades of the regular academic department of the institution. As strong a showing as that made anywhere is in the large room devoted to the classes in design and architecture. This is especially true in the architectural department, where a much higher grade of work than ever exhibited in previous years is to be seen. The methods of expression in architectural design have improved beyond compare with examples shown in former years. Less weakness is noticeable in the mechanical and artistic execution of the designs and, also, the designs themselves show a more decided character of excellence. Especially in the classic composition does the school training show, and, as is natural in such cases, the students show themselves more at home than in any other style.

The work in the classes of design is most excellent. In the

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designs for ceilings, architectural ornamentation, mosaics, tiles, wrought-iron, etc., the work of the architectural school is most happily supplemented. Very attractive studies, showing a feeling for things artistic, though not giving evidence of such hard work as in some of the other departments, are the designs for book-covers and posters. The design of architectural ornament executed in plastic evince more originality than in previous years, though the Sullivanesque spirit, spoken of as shown in former exhibitions, is still somewhat apparent.

The advances which the architectural school is making will, before many years, place it on the same grade with the best technical schools of the country. A certain advantage will also be gained by its connection with the academic department, an advantage which it gains over many of the other schools not so situated. That there is advantage for the scholars in drawing from the casts, that they gain much in having lessons in water-color and pen-and-ink from men like Fleury, that freedom in design must come from practice in such drawing and work in a constant art atmosphere, no one can fail to admit, when the work of men having such advantages is contrasted with those who have not had them. Certainly, a museum as fine as that already possessed by the Institute cannot fail to be a great factor towards a better understanding and appreciation of art in all its branches. Mallock says in his "*New Republic*," that a cultured man is one "on whom none of the fine flavor of life is lost." If this is true of culture in general, it is, above all, true of artistic culture, and nothing makes for that culture so surely as a familiar intimacy with the best of art in all ages, and the art school which cannot give its students that intimacy fails in a large and important part of its teaching.

As the students are growing older and their number of years of working together increases, a certain amount of *esprit de corps* begins to be visible — always a good thing for a school.

Most people away from Chicago will be surprised to know that the Art Institute numbers seventeen hundred students in its school-membership roll, and those most interested in the institution itself feel that, from the fact that unlike many similar institutions the school itself is self-supporting, it has reached the place where it is bound to prosper in spite of hard times and financial depression. This extremely good financial condition shows what may be accomplished in a school which has been wisely managed, and whose growth has been natural and steady, expenditure and enlargement coming only with the actual needs.

As there are no preparatory schools to draw from, the Institute must take such material as is at hand, and when the question of raising the grade occurs, it can only be considered by increasing the amount of study required during the course, or the number of years for its completion.

One advantage which the school has had over many another is, that the positions of manager and director have from the very first been held by the same two men, men who were most thoroughly suited to fill those positions. No years have been wasted in "fresh starts," but the growth of the Institute has been a steady and natural one.

VIBRATIONS OF BUILDINGS.

MR. J. R. MILNE, F. R. S., says, in *Engineering*, that the vibrations experienced in the buildings of many large cities are usually those created by passing trains or the proximity of machinery running at a high speed. They are usually truly elastic in their character, and so minute that it is often difficult by mechanical means to obtain a record from which they are distinctly measurable. By such means, however, the writer has obtained distinct diagrams showing rapidly recurring movements of less than one five-hundredth part of an inch. With photographic registration, movements of very much less amplitude may be noted. If we are content with merely seismoscopic evidence of the existence of vibrations in a structure, it is not difficult to put up apparatus that shows us the vibrations caused by a cab a quarter, or more than a quarter, of a mile distant. As the cab approaches, the movements of the apparatus increase until it passes, when they are at a maximum, after which they die away. The actual motion in the building which causes such tremors can be measured as fractions of some unit, like an inch.

The disturbance seen in a dish of mercury, caused perhaps by a train passing at a distance of one or two miles, only tells us that vibrations are present, but such observations do not enable us to speak definitely as to their magnitude.

One curious feature presented by vibrations in buildings is that of their distribution. In a tall building, rooms at about two-thirds of its height may possibly experience more movement than those at lower levels, although we may have every reason to suppose that the motion has entered the structure at its basement, and then passed from the lower stories to those at a higher level. Another peculiarity is the great difference observable in the quantity of motion felt in rooms upon the same story, which is probably dependent upon differences in the arrangement of beams and materials used in construction.

Although the study of these movements is of the greatest scientific interest, the practical aspect of the question generally resolves itself into the ways and means by which they may be minimized or destroyed. To minimize vibrations which exist in a building is a problem which can sometimes be solved by the builder, but the means by which this is accomplished vary with the conditions by which he is surrounded. The destruction of vibrations usually devolves upon the mechanical engineer, who may at once be faced by the impossible problem of obtaining complete balance for an ordinary type of engine. Assuming that his engine cannot be changed, the next solution of the problem is to so balance his engine that it produces a minimum disturbance, to do which he must first determine which components of motion are producing the greatest effects. Should this fail, he is left to join hands with the builder, and seek means whereby the evil creations may be eaten up by damping or discharged to air.

After a factory has been established, the destruction of the vibrations it creates is often a matter of difficulty and cost, both of which might often be avoided had proper consideration been given to the character of the machines employed, their foundation and their sites, before the installation had been commenced.

From the preceding imperfect notes, it will be gathered that the study of the vibratory motions of earthquakes, and the jolts and vibrations experienced on railroads, have led to results which, whether regarded from a humanitarian or a financial point-of-view, are of considerable importance. As to the results which may accrue by extending our knowledge of the vibrations of bridges, steamships, buildings and various structures, inasmuch as we are only yet entering a new field of inquiry, it is impossible to foretell; but from the little we have already gleaned, it is not unlikely that the study will be accompanied with fruitful returns.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

THE ALCAZAR, ST. AUGUSTINE, FLA. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print, issued with the International and Imperial Editions only.]

GRACE CHURCH MISSION CHAPEL, NEW YORK, N. Y. MESSRS. BARNEY & CHAPMAN, ARCHITECTS, NEW YORK, N. Y.

IN a quarter of the city which is absolutely bare of architectural adornment, where the struggle of life is so severe that there can be no thought of forms or of the meaning of beautiful things, the architects have set a cluster of buildings which can not fail to have the refining effect of simple beauty, and which will tend to bring pleasanter forms into the character of future buildings.

The scheme of the architecture is of the later French Gothic, and the simplicity of the walls surmounted by an elaborately decorated tower gives one the impression of a strength and grace which, in this type of buildings, are inseparable.

Fronting Fourteenth Street one sees a massive gateway, screened with wrought-iron gates, the decoration of which preserves the general forms of the Gothic decorations of the church. Beside this, toward the East River, appears another gate, wide enough to serve its purpose of a hospital entrance, and beyond this is seen the trinity of low buildings, which have been erected for a triple hospital — one division for old women, another for old men and the third for children. These buildings have been named in the same order — the House of Ann, the House of Simon and the House of the Holy Child. The color effect of the group is subdued and exceedingly grateful in the surrounding waste of dirty red brick. The architects have used brick with a narrow face, and of the color of well-dressed brownstone. Within this background the windows of the church and the morning chapel stand as the only bits of distinct color.

This is not alone to be a church and a hospital, but a complete ecclesiastical establishment. The interior of the main church carries out the general scheme of the exterior in its warm decoration, the desirable simplicity being at all times rigidly observed. The edifice will seat 800 persons. The high roof is trussed, but this is done so skilfully as to give it the appearance of having massive woodwork resting upon light-colored pillars. At the right of the church is a frieze of the apostles in life-sized figures, and at the left of the chancel there is a remarkably beautiful window presented to the church as a memorial of Helen Hoffman Coppel. Above the altar are three lancet windows representing sacred subjects. The altar-piece is an old Spanish painting, of great beauty, of Christ bearing the cross, a memorial of Albert Gallup.

Along the eastern side of the church extends an arched passageway, which in other lands and under other conditions would be known as the cloisters, but here it serves to connect the Fourteenth Street front of the group of buildings with the buildings in Thirteenth Street. They open on a wide court which will be used as the open-air playground for the children who will come under the influence of the establishment. The hospital is fitted with the most modern appliances for the relief of the injured or destitute sick. The wards are large and roomy and the dispensary has all the conveniences and the seclusion so desirable in an institution of that kind.

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The buildings in Thirteenth Street consist of a clergy-house, a club-house and a parish building, and in these the skill of the designer is shown in an admirable manner, setting this village of clerical and educational work down in so restricted an area. The club-house is an immensely interesting building, showing, as it does, what modern church work means in a crowded city like New York and in a densely populated neighborhood such as this one. In this building are about all the conveniences which could be asked for in the most carefully arranged fashionable club. Of course, its extent is limited, but all that is necessary to amusement or exercise and cleanliness is there. The parlors are tastefully furnished and decorated, the reading-rooms are spacious and well-lighted, and made especially inviting by the comfortable character of the furniture and decoration, and the gymnasium will compare favorably with those in the much more pretentious athletic clubs. In the gymnasium is a space allotted for hand-ball and the paraphernalia of the athletic work is of the best sort.

Opening off of this is a series of dressing-rooms and a huge swimming-tank, lined with porcelain brick and heated with steam coils. Hence it is believed the neighborhood will be convinced that the propaganda which Grace Church is engaged in does not mean to exclude the enjoyment of healthful exercise and the luxury of a plunge.

The parish-house includes the school-rooms for all ages of students, not forgetting a night-class of adult students, and each of these rooms is made attractive by means of their admirable ventilation and carefully simple decoration. On the top floor of this building is a very large room, which is to be used for the Sunday-school for all classes. It is a particularly pleasant apartment even now, without its occupants, for it impresses one at once with a sense of cheeriness, because of its broad windows and its lofty ceiling. The room is not quite rectangular, and its slightly broken area adds to the effect of spaciousness.

Besides these apartments there is a cooking-school, which has not alone the practical purpose of teaching the girls of the neighborhood how to prepare palatable food, but the still greater charity of giving the hungry of the district an opportunity of securing some of the food prepared which otherwise would go to waste.

On the lower floor of the Clergy House are the offices of the mission. The second floor is devoted to a suite of apartments for the vicar. Above this are the rooms for the deacons who will assist the clergyman in the work of the mission. There are six of these rooms, all opening, in case it is desired, on a set of rooms which may be used in common, either for work or amusement. The apartments are handsomely furnished and are very inviting. Above these, again, are the rooms of the sexton.

Standing on a platform which is on a level with the third floor of the parish-house and looking out on the cluster of buildings, the central tower shows its height and its massiveness, and its clustered decoration about the belfry makes it the crown of the whole beautiful group of buildings. The belfry contains a carillon which was given to the church in memory of Martha Green Potter, a niece of the Bishop of the diocese.

One of the most attractive parts of the church is the morning chapel on the Fourteenth Street side of the group. It will seat only one hundred persons.

MISSION BUILDING FOR GRACE CHURCH PARISH, NEW YORK, N. Y. MESSRS. BARNEY & CHAPMAN, ARCHITECTS, NEW YORK, N. Y.

INTERIOR OF GRACE CHURCH MISSION CHAPEL, NEW YORK, N. Y. MESSRS. BARNEY & CHAPMAN, ARCHITECTS, NEW YORK, N. Y.

HOUSE FOR CHARLES D. CAMPBELL, ESQ., WEST NEWTON, MASS. MR. E. L. CLARK, ARCHITECT.

[The following named illustrations may be found by reference to our advertising pages.]

BOOK-COVER, IN GOLD, SILVER AND ENAMEL, OF ALBUM OF THE MOSCOW EXHIBITION, PRESENTED TO THE CZAR, ALEXANDER III. DESIGNED AND EXECUTED BY MM. CHRISTOFLE.

DECORATION OF THE VAULT OF THE HALL OF PENITENCE, PALAZZO FARNESE, CAPRAROLA, ITALY.

PORTION OF SGRAFFITO DECORATION, VIA DI S. MATTEO IN MERULANA, ROME, ITALY.

A GROUP OF CANOPIES.

[Additional Illustrations in the International Edition.]

ENTRANCE PORTICO: HOTEL PONCE DE LEON, ST. AUGUSTINE, FLA. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

DETAIL OF THE ALCAZAR, ST. AUGUSTINE, FLA. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

SOUTHBOROUGH PARK ESTATE, TWICKENHAM, ENG. MR. ROLAND PLUMBE, ARCHITECT.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

"THE ADVERTISING FAKE SCANDAL" AGAIN.

IT is not infrequently that we receive from indignant architects copies of trade-circulars which offer to architects, in the shape of a commission on sales effected through their agency, what is in reality nothing more nor less than a bribe, which no honorable architect can accept. Such circulars are sent to us by architects, with the request that we "show up" the authors of these debasing proffers, whose mere existence and issue are so grave an injury to the profession.

We have always entertained doubts as to what was the real intent and meaning in the minds of their authors of these offensive circulars, and believing that in very many cases nothing wrongful was intended, and that in proffering a bribe the tradesman apprehended he was only extending a lawful "trade-discount," we have made a practice of writing at some length to the authors of such circulars, explaining what is the real fiduciary relation between architect and client, and how impossible it is for an honest architect to accept such discounts, and formally counselling them to discontinue a practice which, at best, could only bring them into contact with the dishonest few rather than the honest many. We are pleased to say that in *every* case where we have made this explanation we have received a grateful acknowledgment of the trouble we have taken, coupled with the statement that the commission had been offered in entire ignorance of the real relation of architect to client; that it had been withdrawn from circulation and that no others of similar character would be sent out.

We make this statement because it has a bearing on the opening paragraph of the subjoined letter from a large manufacturing concern whom we had been requested by architects to "show up," because of their seemingly nefarious methods of business.

As to the subject-matter of the communication we have already expressed our opinion, and have declared our feeling that this matter of fake advertising constituted a scandal to the profession. Of course, in a profession whose bonds of membership are as loose as are those of architecture in this country, there must be men of varying grades of moral perceptiveness, and we had imagined that it was only in the ranks of the "ar-chi-tects" that could be found those who would condescend to meddle with advertising fakes. It will be noted, however, that our correspondents allege that a certain "well-known firm of architects" has attempted to blackmail them into advertising. Happily, a firm can become "well known" for more causes than one, and we hope that if the firm in question is not already known as seeking an income through dishonorable methods, it will speedily become so.

Fortunately, the cure of the evil is largely in the hands of the advertisers themselves — not a very large class, and once these advertisers are awakened to the fact that these architectural souvenirs are nothing more nor less than blackmailing fakes, this scandal to the profession will be very short-lived.

July 15, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Under date April 15th, you took occasion to write us concerning a letter which we had been sending to architects; the architects took exception to our letter, and in deference to them, we withdrew it, as we did not wish to do anything that would be objectionable to them as members of a profession. Your letter left us with the impression that it was your aim to rectify wrongs, no matter where they exist, so we to-day call your attention to methods adopted by too many architects, and that is, in publishing books of designs, and compelling material-men and manufacturers to pay the expense of such publications. The reason we use the term "compel" is, that the material-men and manufacturers feel compelled to yield to the architect's solicitation for an advertisement — they feel that if they do not do so, the architect will have occasion to drop them from his list for all future work. From a letter now before us, received from a well-known firm of architects, we quote as follows: "We have decided, in addition to the illustrations and descriptive matter, to insert special advertisements from builders, artists and material-men, *whom we recommend to our clients*"; and again, "The descriptive matter shows who the builders were, and the kind of material used"; and

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again, "The book will be distributed among a list of people that we have carefully prepared, and in other ways, which, in our judgment, will be to the *best interests of all concerned*"; and again, "*It will be valuable in its influence*," from all of which we understand that if we, ourselves, do not join with the architect in this advertising scheme, and contribute what he conceives to be our share towards the expense of the publication of his book, we will not only be dropped from his list, but, it may be, that his influence would be used with his clients in a way that prospective orders for our apparatus would be lost. You can see that this places us in a very embarrassing position; there is not enough profit in our business to enable us to place advertisements with all the architects who send us such letters, and yet we feel that if we refuse, or offer an excuse, or even if we do not make any reply, that we will suffer accordingly. Now, we feel that this is an injustice, which should be corrected, and that if architects choose to publish their designs, the advertisements of material and apparatus men, and others, should not be permitted therein, but that the architect should stand the expense of his publication, just as material-men do the expense of their catalogues and other publications. We cannot afford to come out openly and make the statement which we now make to you confidentially. Our only object in writing you is to see whether the Association of Architects will not put its stamp of disapproval upon these methods. The letter we refer to gives us no opportunity to dodge in any way. We quote from the letter the last clause, as follows: "We ask, as a special favor, that you give us an expression of your wishes in the matter, at once." It seems even dictatorial in its tone. Do you not think so?

Trusting the matter may have consideration, we remain,

Very truly yours, —— Mfg. Co.

ARCHITECTS OF THE BULFINCH FRONT.

To the Editors of the American Architect: —

Dear Sirs, — Not very long ago Messrs. A & B, two Boston architects, thinking that the work upon the Bulfinch front might, as a matter of business, be considered separately from other work upon the State-house, made an effort to obtain that commission for themselves.

The matter was brought to the attention of the Executive Committee of the Boston Society of Architects who promptly and imperatively condemned the proceeding, saying that Mr. Brigham was the architect of the State-house and that to supersede him in any portion of his work was both unkind and unprofessional.

Upon this presentation of the case Mr. A, who was a member of the Boston Society of Architects, immediately withdrew, and after a time his partner gave up the chase.

Within a few days a trio, consisting of the President of the Boston Society, another member of its Executive Committee, and the gentleman selected to represent that Society in the councils of the American Institute, have accepted the commission which the other architects were condemned for coveting, and have presumably entered upon their work.

The *American Architect* is, I believe, the organ of the American Institute of Architects. What does it think of the above proceeding?

X.

[Our correspondent evidently writes under the impression that he has lighted upon a case of tweedledum and tweedledee. Even if the two incidents he cites had transpired contemporaneously, instead of at intervals of two years, during which surrounding conditions had changed very materially, there would be marked differences between the two cases. It seems enough to point out here that, in the first case the men were seeking the office, and in the second the office was, emphatically, seeking the men. In the first case the assumption was, in the slang of the day, that "a public office was a private snap"; in the second case, the assumption is that it is the duty of a good citizen to yield gracefully to a public demand. We must on our own behalf point out that the *American Architect* is *not* the "organ of the American Institute of Architects," or of any other body. Like the New York *Sun* it, so far as it is able, "shines for all." — Eds. American Architect.]

A CORRECTION: ST. MARIA DI CARIGNANO, GENOA.

Boston, Mass., July 22, 1896.

To the Editors of the American Architect: —

Dear Sirs, — In looking over some of your latest issues, I find in that for June 27, a half-tone of the Church of St. Maria di Carignano, which you place in Geneva, Switzerland.

May I call your attention to the fact that the church shown in your illustration is in Genoa, Italy?

Very sincerely yours, Lois Lilley Howe.

[The blunder our correspondent corrects was due to misreading Genova as Genève. — Eds. American Architect.]

THE UNIVERSITY OF CALIFORNIA COMPETITION.

San Francisco, Cal., July 6, 1896.

To the Editors of the American Architect: —

Dear Sirs, — I am in receipt of the copies of your issue of June 13th, for which find enclosed postal order, with my regrets that your paper does not take a more hopeful view as to the result of the contemplated competition for the plan of buildings of the State University.

Many of the greatest architects of this country have written me, stating that this competition is the greatest opportunity they have known of in the history of architecture, and we, in California, believe this to be so, and, so believing, we are a little surprised that this matter is treated with less consideration by the leading architectural journal of this country than by similar European journals.

It is but just to state that your views express the fears of others in this behalf, but whatever their grounds of fear and foreboding as to our success by the methods we may adopt, we beg to assure you, and through you, all others, that the Board of Regents of this University will succeed in this enterprise, for they will devote time, care, thought and attention enough, and far more than enough to *doubly insure* that success.

Every human end *can* be had, if the requisite means be employed, and we will furnish such means, and have plenty to spare.

We will show adequate and superabundant cause for the effect we seek.

We reiterate, that we contemplate placing on the noblest site of the earth the most glorious architectural pile in history — and *we will do it*.

"The East" takes too little "stock" in "the West." It deems our claims as to the site and the buildings contemplated, a thoughtless boast.

Those who have seen the site know that it is and must be an inspiration, and those who understand our people appreciate that we will make that inspiration a reality, and it is high time that the Eastern people, with the glory of the World's Fair at Chicago dazzling and dazing them, should take us seriously and should begin to believe that there is on this western shore a deep and abiding sentiment for the true and the beautiful; that fair women and brave men are here; that we love the State of our birth, royally blest by nature as she is; and that we have a just pride in her glory and that of the Union of which she is so glorious a part, and that such a people in such a State, for such a purpose, knowing what they want, will not fail to get it.

Yours very truly, J. B. Reinstein.

[We publish the foregoing letter from a Regent of the University of California that intending competitors may, by aid of its statements and its rhetoric, gain a further insight into the conditions that surround this competition. We gave the matter careful, not careless, as our correspondent infers, consideration and have no desire to modify what we have already said. We regret sincerely that in satisfying their needs the Regents have elected to follow a method that entails a cruel waste. We cannot forbear remarking how bodingly mournful it is that in writing such a letter upon such a subject, a man of our correspondent's position should feel it necessary to drag in the "East" and the "West." — Eds. American Architect.]

NOTES AND CLIPPINGS

Electricity and Water-Power. — There is no form of energy that is so far-reaching in its benefits to the welfare and comfort of the world as electricity. There is no force of means so plentiful in a static condition as electricity. There is no kind of power that can be so absolutely controlled by a consumer as electrical power. There is no source of energy so easy of access or so richly provided as water-power. There is no form of motion that is more perpetual than a waterfall. There is no machine that depreciates so little for the amount of work it performs as the dynamo. There is no medium of transmission so little wasted by transmitting power as a wire. There is no form of investment more certain of continual returns, than an intelligent development of electrical water-power plant. There is no reason for delaying the use of our waterfalls except that our investors do not as yet fully appreciate their importance. There are waterfalls enough to turn all the machinery required for the comforts of mankind for centuries to come, and, unlike other sources of energy, they are exhaustless. By the union of electricity and water-power our great and now smoky manufacturing cities can be made models of comfort and cleanliness. By the combination of these two forces, the locomotive with its soot and cinder can be hushed and side-tracked. By the adoption of these sources of energy and heat our great blast furnaces and smelting works may become odorless and clean. — *Mark A. Replogle in the Electrical Review.*

The Eyesight of School-children. — The important matter of the sight of school-children has been receiving attention in Baltimore. The eyes of 53,067 pupils were examined, and the percentage of normal vision was found to be: first grade, 35; second, 41; third, 47; fourth, 49; fifth, 48; sixth, 48; seventh, 54 and eighth, 56 per cent. In the cases of 9,051 pupils the eyesight was found to be so defective as to make any schoolwork unsafe. An unexpected and unexplained result of the examination was the showing of a steady decrease in defective eyesight from the second to the eighth grade, the second showing 30 per cent less than the first, the third 42 per cent less than the second, the fourth 53 per cent less than the third, the fifth 63 per cent less than the fourth, the sixth 75 per cent less than the fifth, the seventh 85 per cent less than the sixth and the eighth 91 per cent less than the seventh. The eyesight of some pupils in the higher grades had been improved by their wearing glasses, and some teachers found that "stupid" children were making better students after an examination of their eyesight. — *N. Y. Evening Post.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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AUGUST 8, 1896.

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WE wish to call attention again to the examinations which soon will be held by the United States Civil Service Commission for draughtsmen and assistants who desire to secure places in the office of the Supervising Architect of the Treasury. It will be remembered that the experiment was tried a few years ago of making appointments in the Supervising Architect's office through examination. The examination was altogether too strict to suit the taste of the politicians who had hangers-on with a taste for drawing whom they wished to favor with a place at the public crib; and advantage was taken of the passage of a bill appropriating money to pay the expenses of the Supervising Architect's office to attach a clause providing for the employment of temporary assistants without examination. Since then, although the provision was ostensibly made only for a special emergency, the appointments of assistants have been made in accordance with it, and it was not until the promulgation of the President's order of last May, extending the Civil Service Act over the remaining branches of the public service, that definite steps were taken to make all appointments in the office of the Supervising Architect dependent upon qualifications to be ascertained by competitive examination. As, under the Civil Service rules, public servants who are faithful and diligent have little cause to fear removal, but, on the contrary, may look forward to promotion, the Treasury Department, feeling that a body of assistants selected and governed in this way may safely be entrusted with much greater responsibility than can be placed upon men appointed merely through political influence, proposes to confide to them the supervision as well as the designing of the public buildings. As all architects know, the supervision of these buildings has been hitherto entrusted to local superintendents, generally appointed on the recommendation of Congressmen, the Supervising Architect himself only making short and rare visits. These local superintendents have usually been builders, who, even if they should possess the rare accomplishment, among builders, of reading plans accurately and intelligently, were inevitably on such terms of intimacy with the contractors for the building as to make it difficult for them to attribute to the latter anything but the best intentions. Moreover, as the salary of the local superintendent was stopped at the completion of the building, he had no inducement to hasten the work, and the proverbial slowness of building operations carried on by the United States Government probably finds its explanation in part in this circumstance. With superintendents detailed from the office of the Government Architect, familiar with the planning and construction methods of the office, anxious to do their duty faithfully, and quite indifferent to the sensitive feelings of influential contractors, it is reasonable to believe that the conduct of the public building-work may be greatly improved, and the Supervising Architect's office made especially valuable to young architects as a school in which can be gained that experience in important operations which it is so difficult to get in the earlier years of ordinary practice. As the law requires, notice will be given by advertisement of the time and place of these examinations, and young men of attainments and ambition may do well to be on the look-out for such advertisements. Examinations under the Civil Service Act are usually held in all the important cities, so that it will probably not be necessary for candidates to make the journey to Washington; and persons who would like to be candidates, but fear missing the advertisements, may obtain such information as they need by addressing the Civil Service Commission, Washington, D. C.

SPEAKING of the change which it is suggested that the National Association of Master Builders should make in the Uniform Contract, by substituting "standard gold coin" for "current funds" in the clause describing the sort of money that the contract price shall be payable in, a correspondent observes that in important contracts it is already very generally stipulated that payment shall be made in gold coin "of the present standard of weight and fineness." This is the usual form in mortgages, where payment is to be deferred for several years, and where it is undoubtedly desirable that the lender should be protected against the adoption of such recommendations as that of an ingenious politician, who proposed not long ago to secure "harmony" between the two wings of the Democracy by coining a new gold dollar, of half the weight of the old one; but it seems less necessary in building contracts. However, as the object of the change, if any is made, is to secure payment of the contract price in the same sort of money that both parties had in mind when the contract was made, instead of a cheaper sort, it may be worth while to add a few extra words to put the matter beyond all possible dispute.

THE striking workmen at Cleveland, or rather, their self-appointed leaders, have undertaken a task in which the public has an interest. The Governor of Ohio, finding that citizens were being forcibly prevented from exercising their profession, and were assaulted on their way to and from their work by such overwhelming numbers of men that the police were unable to protect them, ordered some companies of militia to guard them. As the cowardly ruffians who maltreat people for simply trying to make an honest living are in mortal terror of bayonets, this sort of protection proved quite efficient, — too efficient, in fact, to suit the taste of the professional mischief-makers. The latter, therefore, devised a scheme for applying to the citizen soldiers that system of persecution whose cruelty and wickedness have never yet been adequately shown. They notified the people whose action they knew how to control to refrain from buying goods at any store where a militiaman was employed, supposing that the loss of business resulting from this interdict would lead to the discharge of the military man. Fortunately, the edict of the walking-delegates, terrible as it is to the poor workmen who cannot escape its execution, presents no such aspect to the ordinary citizen, and as the latter likes to think that a man with a rifle on his shoulder, and a stout heart in his bosom, is ready on occasion to defend decent people against howling assassins, the result of the attempt seems to have been to direct the favorable attention of six-sevenths of the population of Cleveland toward the men whom the other seventh were persecuting on account of their faithfulness in fulfilling the most sacred duty that a man can take upon himself, — the protection, at the risk of his own life, of innocent people against violence.

ALMOST discreditable story is reported from New York. It will be remembered that, a year or more ago, one Oberfield, who has become notorious for the cruelty with which he uses his power as a walking-delegate, to serve his private ends, and who had already been indicted by the grand jury for his acts, took a grudge against a carpenter named Alexander Douglass. It seems that Douglass was a member of the union, in good standing, and his sole offence was that he opposed Oberfield's election as walking-delegate, but for this Oberfield relentlessly hunted him out of shop after shop, until, in despair, he applied to the courts for relief. On the evidence presented, the grand jury indicted Oberfield a second time, and the indictment was turned over to the District Attorney for prosecution.

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Notwithstanding the indignation which the publication of the circumstances aroused, the indictment appears to have been stowed away in a pigeon-hole in the District Attorney's office, and to have been left there ever since. Meanwhile, Oberfield, enraged that Douglass should dare to bring his troubles before the courts, has taken advantage of his impunity to redouble his persecutions. About six months ago, Douglass's wife came to Mr. McIntyre, then Acting District Attorney, in great distress, saying that, in consequence of his complaint against Oberfield, her husband had been unable to get any work; that their children were starving, and that her husband had become so despondent that she was afraid he might take his own life; and she begged that something might be done to relieve him from his tyrants, and give him a chance to earn his living. Mr. McIntyre, who knew that this was not the first instance in which justice had been similarly delayed, called for one of his subordinates, and ordered him to bring the case to trial at once, saying, as the *Evening Post* reports, "It is a standing shame and disgrace that nothing should be done about these labor-union cases. When I see poor people like this woman despairing of ever securing justice from these courts, I often wonder whether some time their burden may not prove too much for them. I should not wonder if some time we should wake up to find the Criminal Court building surrounded by a mob of poor people from the East Side and other places, clamoring for justice and for vengeance against their criminal oppressors." Notwithstanding this energetic expression on the part of the Acting District Attorney, of sentiments which seem to be generally shared by judges and others who are likely to know most about such matters, nothing was done about bringing Oberfield to trial, and from that time to this, his indictment appears to have reposed quietly in its pigeon-hole, in company with a number of others of the same nature, which is increased from time to time by new additions.

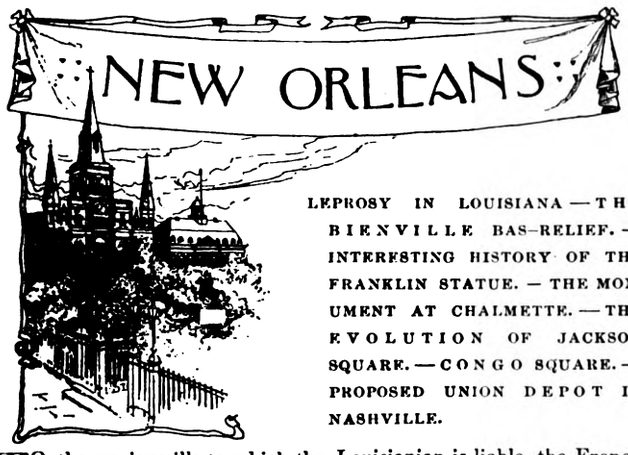
IT would not be fair to accuse Mr. McIntyre of insincerity in the matter. Both he and his superior, Colonel Fellows, seem to be really anxious to have justice done, and the latter is said to have given strict orders this summer, before leaving the office for his summer vacation, to have all these cases put on the calendar for immediate trial; but the details of the work of the New York District Attorney's office must be intrusted to subordinates, and some of the latter seem to use their own discretion about carrying out the work assigned them. The *Evening Post* points out that the assistant who has charge of the Criminal Court calendar was, before receiving his appointment in the District Attorney's office, counsel for several of the most prominent labor unions of the city, and is said still to maintain a connection with his former clients, and suggests that this circumstance may furnish "a possible explanation" of the disposition made of indictments against union conspirators. Another "possible explanation" of the matter is that this particular case, among others, is said to have been assigned to a different assistant, who, after unsuccessfully trying one, abandoned all the others, and has gone away on a long vacation. Whatever may be the true reason for this denial of justice to citizens whose living depends upon securing the protection that they seek, there can be no doubt that the difficulty should be remedied at once. If the grand jury cannot prevent its indictments from being hidden away indefinitely in pigeon-holes by irresponsible assistant District Attorneys, the Bar Association could apply salutary discipline to attorneys proved guilty of delaying justice, either negligently or intentionally, or one of the citizens' associations which have done so much for New York might take up the matter.

THE O'Brien case of the display of the Irish flag on a school-house in Massachusetts, in derogation of the dignity of that Commonwealth, was tried in the court of first instance a week or two ago. It will be remembered that O'Brien, the contractor of the building, maintained, through his counsel, that as the structure was incomplete, and had not been delivered, it was not yet a public school-house within the meaning of the statute; and, at the trial, the point was also raised that, as Ireland was not an independent sovereignty, the green flag of Erin was not the emblem of a foreign country, such as the statute refers to. The judge of the police court decided adversely to the contractor on both these points, and ordered him to pay a fine of ten dollars. An appeal was taken, and Mr. O'Brien will, apparently, have the pleasure of paying for the discussion of historical as well as legal problems before the higher courts.

NO one can read German novels of the present day without being struck with the important part that forests play in these representations of what is probably, in such matters, the real life of the German people. Everywhere we find the distinguished Baron, or Count, or Freiherr, whose enormous wealth is surpassed only by his still more enormous pride, drawing a large part of his income from his forests. The poor young relative, who occupies an almost menial position in the household, and who afterwards turns out to be the rightful heir, and carries off triumphantly the maiden with the flaxen braids for whom he had so long sighed in secret, almost always begins his inspection of his new domains by a visit to the Försterei, where he confers with the forester and his subordinates in regard to the disposition of the large and steady income proceeding from this part of the estate. Moreover, the Försterei itself is usually described as a well-built and roomy house, in which the lord of the manor is not himself ashamed to lodge on occasion, while its occupant and his family are generally on terms of friendship, if not of intimacy, with the noble personages at the castle, who regard them as the conservators of the most easily managed, and most steadily profitable portion of the estate. Turning from these pleasant pictures of aristocratic affluence maintained for centuries by the income from a few hundred acres of well-kept forest land, to our own country, what do we see? We have woodland enough, certainly, but no one, as a rule, laughs more bitterly at the idea of obtaining an income from it than the owner. Far off in the North, the great tracts of virgin forest, the only woodland which is considered among us to have any value, are systematically denuded by the railroads or lumber companies, who strip off everything that can be turned into a joist, or clapboard or shingle, and leave the place bare. This done, the land is either left desolate, or, if well situated, is sold for a trifle to a farmer, who digs up the stumps with immense labor, ploughs and harrows the ground, and sows it with wheat. For a few seasons the wheat returns him fifteen bushels to the acre, and he sells his crop at a price so low that it can be transported five thousand miles to Liverpool, and sold there in competition with Argentine wheat, raised by half-naked savages on the fresh prairie soil bordering the La Plata River; a sale at this low price being the alternative to not selling it at all. After a generation of this sort of husbandry, the land, unfertilized, refuses to produce any more wheat, and the farmer abandons it, and moves to a fresher soil. Then persevering Nature asserts itself, and little crooked trees begin to spring up, in the place of those which had been cleared away. Singularly enough, land that has reached this condition, in which a German forester would see the promise of future wealth, is execrated by our farmers as worse than useless. Many thousands, perhaps millions, of acres of land in the United States, covered with small oak and pine trees, could be bought for a few cents an acre; yet nothing is more certain than that these small oak and pine trees will before many years grow to be large ones, and that, as the virgin forests are cut away, and the demand for timber grows more pressing, every tree will bring its price. What the price will be depends upon the care which is taken of it during its growth, but it is not too much to say that with even ordinary attention to the obvious needs of forest land, the sand-hills of Massachusetts and Michigan, or the barren pastures of Virginia, would bring to a family that had the patience to wait, an average income far greater than those Kansas or Nebraska can count upon from the same quantity of land; an income, too, which would be independent of drought or rain, which would not be in danger of interruption by the exhaustion of the soil, or through any other mischance, except fire, which has few terrors for scientific forestry.

THE Province of Quebec Association of Architects sends us a remarkably pretty circular, announcing an "Architectural and Arts and Crafts Exhibition," to be held in the galleries of the Art Association, Phillips Square, Montreal, commencing on Thursday, October 8, 1896. Exhibits of framed architectural drawings, or sketches, carvings in stone or wood, artistic metal and glass-work, and so on, will be received up to September 24. Further particulars may be obtained from Mr. Joseph Venne, Secretary of the Association, 17 Place d'Armes Hill, Montreal.

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LEPROSY IN LOUISIANA — THE BIENVILLE BAS-RELIEF. — INTERESTING HISTORY OF THE FRANKLIN STATUE. — THE MONUMENT AT CHALMETTE. — THE EVOLUTION OF JACKSON SQUARE. — CONGO SQUARE. — PROPOSED UNION DEPOT IN NASHVILLE.

TO the various ills to which the Louisianian is liable, the French Acadians over a century ago contributed leprosy, of a type differing from the Oriental. Attempts to check its spread began while Louisiana was a colony and have continued spasmodically ever since; but despite these, the dread malady has steadily increased. In 1894, in response to the agitation of the subject by medical societies and the public press, an act was passed by the Legislature creating a Board of Control and providing for the establishment and maintenance of a Home for Lepers. At once, strange to say, opposition to the measure was aroused in New Orleans, where for years no restrictions had been placed upon lepers travelling in street-cars, eating at public restaurants, or begging on the thoroughfares. There was, to be sure, a contract hospital of some kind for lepers in New Orleans, but that is even now under the censure of the city authorities. The opposition resulted in the refusal of the City Council to sanction the erection of an Asylum for Lepers within the city and the site selected for that purpose had to be given up. The Board of Control finally secured a lease for five years of the old Indian Camp Plantation in Iberville Parish. The opposition of the inhabitants of Iberville Parish threatened the existence of the Home for a while, but the Board went pluckily to work, put the cabins on the plantation in sufficient repair to accommodate the lepers and erected new buildings; and on the 30th of November, 1894, a number of lepers were taken by night, upon a coal-barge towed by a tug, from New Orleans to the Home. Since then others have been received, until an aggregate of thirty-one was reached before the 1st of May, 1896. Of these, four have died; of the others, the condition of nine is reported to have been improved. The sympathies of some of the ladies of New Orleans have been enlisted; the aid of the Sisters of Charity has been called in; and every effort is being made, by correspondence with coroners, sheriffs, boards of health and local health officers, to obtain reliable information regarding the number of lepers at large in the State, that they may be located and legally committed to the Home. By coöperating with boards of health in neighboring States, by isolating the cases and caring for them, it is hoped eventually to eradicate leprosy wholly from the State of Louisiana. The State appropriated $5,000 for the improvement of the grounds and buildings and $10,000 annually for the maintenance of the Home.

A bas-relief of Bienville, in the Marble Hall of the Custom-house, escaped the attention of your correspondent a few months ago as he was enumerating the public statues of the City. The man who laid the foundations of the City of New Orleans, who made it the capital of the province, and who repeatedly came to its assistance when it got into trouble, is represented in the costume of a Canadian voyager or hunter. No other portrait or statue of him exists in the city.

There is an interesting incident to be related of the Franklin statue, also recalled since the former letter was written. Both the Franklin and the Clay statues were modelled by Hiram Powers, and it is asserted that the former was an important factor in the life of that famous sculptor. In 1843 Powers was having a struggle for existence, and New Orleans considered itself one of the art centres of the New World. Becoming interested in the new sculptor, some of the citizens organized a club for his relief, raised about $12,000 and sent it to him in Rome as payment in advance for a statue to be made of any subject he might select. It was not until 1869 that the memory of this agreement with Powers was revived. Then Powers executed this statue of Franklin and shipped it to New Orleans. It arrived in troublous times and was mislaid in the Custom-house. When discovered, it was advertised for sale, and rescued by a public-spirited journalist. Meanwhile the pedestal had been lost at sea, occasioning another delay, and so it was not until 1873 that the statue was placed in position. Powers once executed a statue of Washington which the State of Louisiana purchased after the sculptor had acquired fame. It was among the spoils of war sent to Washington by General Butler, and when Congress returned it to Louisiana, it had the misfortune to be destroyed by fire.

In 1836 a monument was begun on the Plains of Chalmette, in commemoration of the great battle fought there in 1815. It marks the spot where Pakenham fell, and was intended to rival Bunker Hill Monument, whose design it copied. The State purposed defraying the cost of the monument and made a handsome appropriation at first, but it was less generous afterwards, and finally suspended its appropriations altogether. As a consequence, the brick tower with marble facings was allowed to fall into decay after it had arisen to the height of about forty feet. It is now a melancholy sight to visitors. The completion of the "Jackson Monument," as it is called (it is intended to be commemorative of the Battle of New Orleans), is one of the works of public interest which have engaged the attention of the ladies of the Crescent City of late. They are likely to push the work forward to completion, though perhaps not in the immediate future.

Clark Mills's equestrian statue of Jackson proved the occasion of an architectural revolution in its neighborhood less than half a century ago, the circumstances of which should be made a matter of permanent record. The revolutionary leader was Madame Montalba, a native of New Orleans, but a Parisian by residence prior to 1848. In the revolution of that year, she discarded her title of nobility, set aside her legitimist sympathies and sought refuge in her native city from the political troubles of France. She brought with her considerable wealth, and an ardent admiration for Andrew Jackson. Immediately upon her arrival she proposed the erection of a statue in the Place d'Armes. She started a popular subscription by which funds for the statue by Clark Mills were raised. Then began the architectural revolution above referred to. In the face of opposition raised by the newspapers of that day, the trees in the Place d'Armes were cut down, a garden was laid-out and the square was renamed "Jackson Square." The rows of old buildings on either side of the square, some of them dating from the foundation of the city, were torn down and the present existing buildings, after Parisian models, were erected and named the Montalba Buildings. But the least admirable of the Madame's "improvements" was the replacing of the original Spanish front of the Cathedral with the present façade. The Madame bore the expense of this, as well as the brunt of many adverse criticisms upon the changes. The visitor in New Orleans who supposes, as he stands in Jackson Square, that he is surrounded by monuments of the remote past, is in error. Only the two buildings which flank the Cathedral are relics of the early days of the city; and it is proposed to condemn and rebuild these.

The former name of Jackson Square, when discarded, seems to have assumed the form of unemployed municipal property, to be disposed of or utilized by an economical city Government, whenever occasion arose. On Orleans Street is a square known as "Congo Square," because in the early days the Congo negroes were accustomed to meet there on Sundays from sundown until nine o'clock, and indulge in their wild music and dance the *bamboula* and *coonji*. When this use of the square was broken up, the neighboring residents desired that its name should be changed. The city authorities at once passed an ordinance that it should take the discarded name of "Place d'Armes." But this and several later attempts to change the name of the pretty little park have all failed, and it remains to this day, in the popular mind, "Congo Square."

News comes from Nashville, Tennessee, of the proposed erection there of a Union Depot, to cost not less than $650,000. It is a greatly needed improvement of that city. The ordinance permitting the building passed the city council, but was vetoed by the mayor, which means delay until an ordinance can be framed and passed which will embody views on that subject held by the Mayor of Nashville and a large body of its citizens.

THE ART OF BRONZE CASTING IN EUROPE.[1] — III.

OF the other Florentine bronze founders of that period, we need only mention John of Bologna, who, in truth, was not a Florentine, but a native of Flanders, said to have been born in 1530: Perkins thinks probably some years later. Amongst other works in bronze he cast a colossal Neptune for the fountain at Bologna, and some years later the flying Mercury, the Grand Duke Cosimo, in the Piazza della Signoria, and the equestrian statue in the Piazza della Annunziata, both at Florence. This last is a very inferior work, and it is believed that John of Bologna had little hand in it. It was cast by his pupil, Pietro Tacca, who probably also did most of the modelling. John of Bologna died in 1608.

The erection of equestrian statues was coming into fashion, not only in Italy, but in France and other countries. In 1604, an equestrian statue of Henri IV was commissioned of John of Bologna, but it was not finished before the death of the artist and the assassination of the king. It was, however, finished and cast in bronze at Florence, I know not by whom, probably by Tacca, and was transported to Paris and erected on the Pont Neuf in 1616. The next equestrian statue that I have any note of is one of Louis XIII. It stood in the Place Royal, and was erected in 1639. The horse was by Daniele di Volterra, and was intended for a statue of Henri II, but the artist dying in 1556, he could not complete the figure of the king. It was afterwards utilized for the statue of Louis XIII, the figure being completed by a sculptor named Biard. I have never seen a representation of this work.

The most important casting ever made in France, or perhaps in any other country, was that of the statue of Louis XIV by Girardon, and cast in bronze by the celebrated founder, Jean Baltazar Keller,

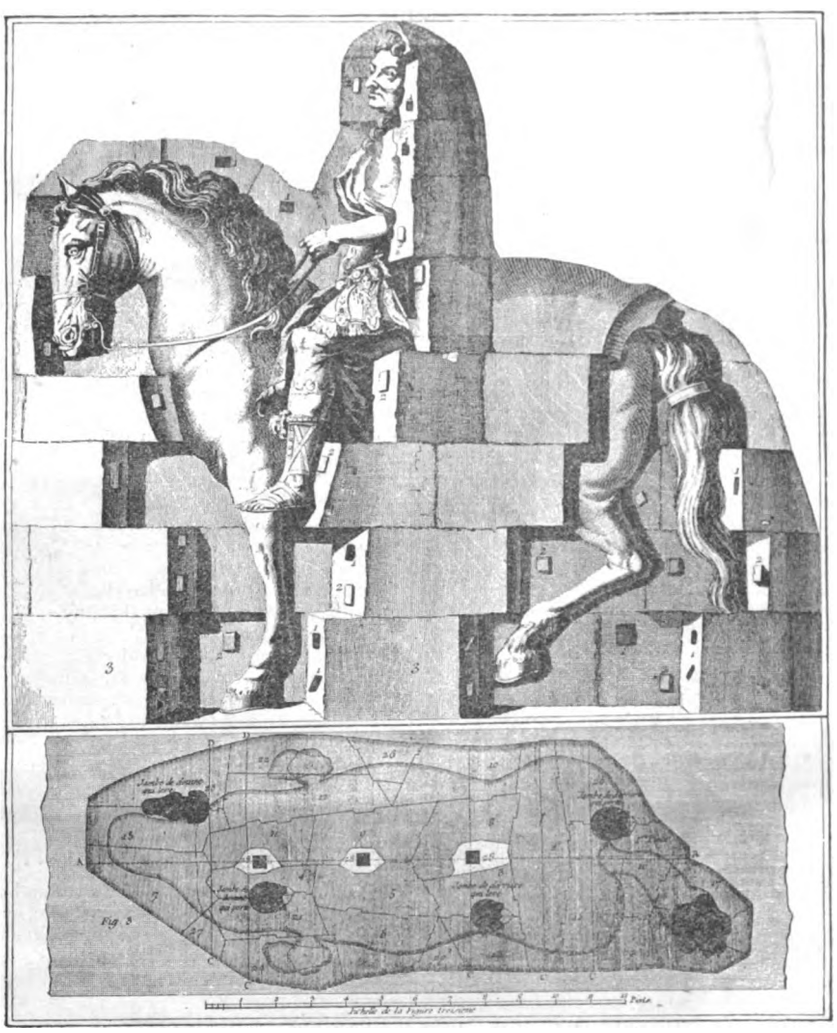
[1] A paper read before the Society of Arts by Mr. George Simonds and published in the *Journal* of the Society. Continued from No. 1074, page 31.

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in 1699. M. Boffrand, the eminent architect, was instructed to take notes and to make drawings of the entire process, and these form a most valuable addition to the literature of bronze casting.

I propose now to describe the method of procedure which proved entirely successful for the casting of this great work, alluding from time to time, as may be convenient, to works by other artists who may have used other means to the same end.

This statue exists no longer. It was destroyed with many others in the French Revolution. It was of great size, measuring twenty-one French feet, or about seven metres in height. The statue was modelled in plaster, on the site where it was to be cast, in a temporary studio erected for that purpose. When the work of modelling was completed, the entire statue, horse and rider, was piece-moulded in plaster. This was not, however, an ordinary piece-mould, but rather an erection of regular-shaped blocks of plaster, of such size and weight as to be easily lifted by hand. This very complicated mould was regularly built up in courses like masonry, each piece being keyed to its neighbors, until the entire statue was built-in. The blocks, which were all carefully numbered and counter-marked, were then removed one by one, and each lined with wax. This was first painted on with a brush, which, in my opinion, was a mistake; and when a very thin layer was thus obtained it was backed up by sheets of wax, rolled out to the required thickness, which varied according to the position, some of the parts being very thick indeed. The next point was the arrangement of the iron frame for the support of the core. This was a very complicated construction, and was all fitted together with cramps, so that it could be taken to pieces and removed, together with the core, through an opening or man-hole on the back of the horse. The irons of the legs, however, were intended to remain inside. The framework was erected above a series of flues or fireplaces, of which the use will be shown hereafter. An iron grating, which was to form the base of the waste mould, was laid over these flues, and upon this the piece-mould was erected, course by course; the iron framing was built up, and the core was being made at the same time, so that, when the plaster mould was entirely built up and restored to its proper position, there was on the outside: first, the plaster mould; next to that, a lining of wax representing the bronze; and within that again, the core, which enveloped the iron framing by which it was to be supported.



Original Model of Girardon's Statue of Louis XIV and the Plaster Piece-mould. From Diderot's "*Encyclopédie*."

There are many ways of making a core, but they may be divided in two classes, viz., beaten cores, that is to say, such as are composed of some material that can be beaten or rammed into a cavity, from which it receives the required form; and cast cores, or such as are poured into the cavity in a fluid state, and are then allowed to set and solidify.

Beaten cores are the safest, but cast cores are the most convenient to make. In this case both kinds were used. The legs of the horse that touched the ground were to be cast solid a considerable way up, and being full of wax and irons needed no coring. The tail, part of the neck and head of the horse, the raised legs, and the body, head and arms of the king were cast cores; but for the legs of the king and the body of the horse a beaten core was used, which was composed of two parts of loam and one part of horse-dung mixed with cow-hair beaten well together with iron rods, and sufficiently moist to be fairly plastic.

The workmen, passing their hands into the body of the piece-mould between the irons of the frame, plastered the wax shell with a layer of this loam about one-half inch thick. This was carefully dried and other layers were added, until the lining covered-in all the irons of the framing, it being then about six inches thick. Bricks of the same material, that had been prepared beforehand and well dried, were now used to increase the thickness, using the same loam in a more fluid state as mortar, until the body of the horse was fitted with a sort of vault, open only at the man-hole in the horse's back. In this vault braziers of charcoal were kept alight until it was perfectly dry. Previously, however, the body, head and arms of the king, as well as the raised legs, head, neck and tail of the horse, had been cored by pouring into them a mixture of one part of brickdust and two parts plaster in a liquid state.

Through the body of the king three small chimneys had been formed leading from the body of the horse to the open air above. This is the first record I have ever found of a lantern and core-vents, and yet, strange to say, they were not intended to be used as such, for, as the core dried, fresh layers were added, and the whole was finally filled up to a solid mass — a very great mistake in my opinion.

It would be tedious to enter into every detail concerning the construction of the core. I have merely stated the broad fact. The next operation was the removal of the plaster mould together with the wax, so as to expose the core to view. The latter was then examined to detect any cracks or other imperfections, and after these had been remedied, the lower parts of the core were further secured by a network of iron wire, and the wax was then, piece by piece, replaced in position on the core, to which it was secured by copper tacks, whose heads were buried in the thickness of the wax, and their points driven into the body of the core. When all the pieces of wax had been thus fixed in their proper places, the next thing was to retouch the wax. This must have been a very troublesome job, owing to the method adopted for covering the core; indeed, we are told that it took M. Girardon a whole year to repair. The wax now being retouched, and the entire statue being absolutely finished, the next process was the distribution of the jets, vents and spouts or drains.

For the benefit of those who have no knowledge of these things, I may as well say that jets, also called runners, are the pipes by which the molten bronze enters the mould and is conducted to its remotest parts. Vents are air-pipes leading from the cavity of the mould to the outer air; their function is to permit a free and rapid exit of the air and gases which would, without such exit, impede the free flow of the metal, and in all probability burst the mould. The spouts, or drains as they are called, are also pipes leading from the interior of the mould to the open air. Their function is to carry off the wax as fast as it is melted inside the mould, as, if no exit were provided, it would, as the heat increased, boil inside the mould, which would destroy its surface and yield a very bad casting. These pipes are merely sticks of wax of varying thickness, according to the requirements of the case, and they are attached to the surface of the wax model by soldering them in place with a hot iron.

There are two opposite principles employed for the arrangement of jets and vents, known as the ascending and the descending principles.

The oldest and commonest principle is the descending, which has many disadvantages, and very little to be said in its favor. It consists in pouring the metal directly into the mould through one or many jets which distribute it to all parts of the mould. It enters the mould from above, and it is claimed that the mould is most quickly filled by this plan.

The other, or ascending principle, has, in my opinion, many

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advantages. On this principle the jets are so arranged that the metal enters the mould from its lowest point, having descended through runners, from above the head of the statue, and rises, on the principle that fluids will find their own level, forcing air, gases and everything else in front of it, until the mould is full. This, no doubt, is the slower plan, since the metal has just twice the distance to flow, but it causes, in my opinion, far less disturbance inside the mould and does not necessitate so many jets and vents.

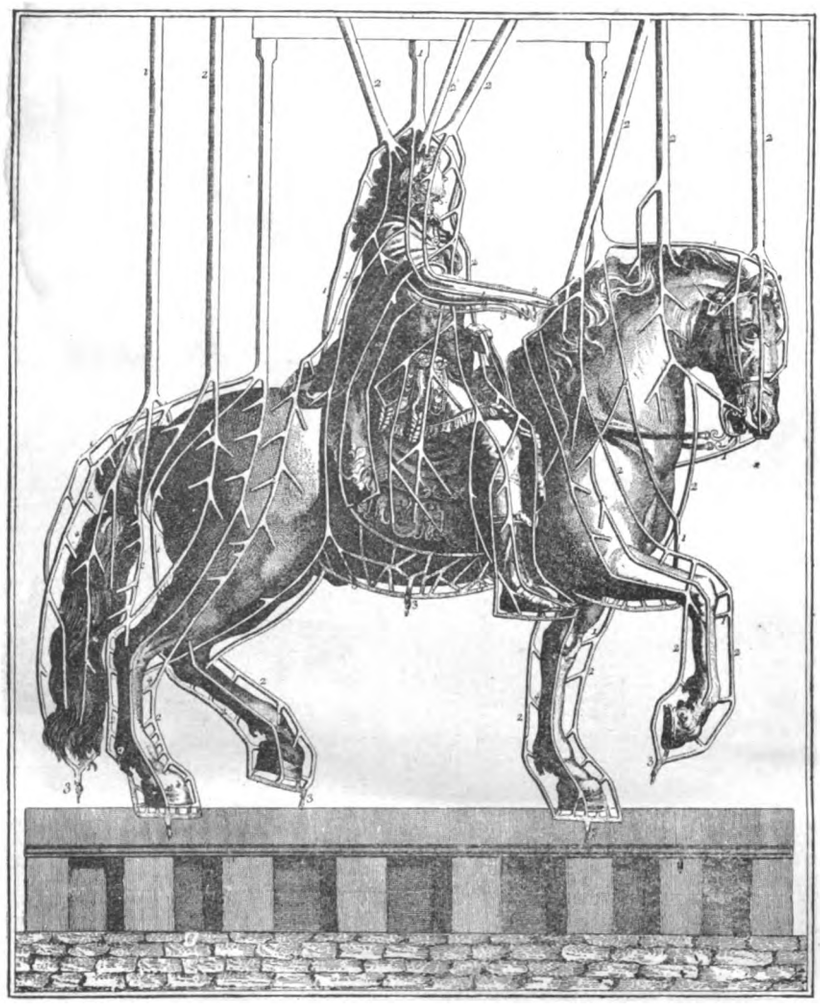
One of the bugbears of an inexperienced founder is the fear that he will not be able to get his mould filled before the metal is too cold to run or take a sharp impression, and yet, as a matter of fact, more bad castings result from too much heat than from too little. An inexperienced hand is always ready to attribute a mishap to the evolving of the metal inside the mould. Probably his mould did not fill because he had not vented it properly and an air-lock was the result, or if the casting is not sharp it is probable that he has either burned his alloy or that his mould was bad. It is not, in all probability, the result of casting cool.

However, MM. Girardon and Keller decided on adopting the old-fashioned descending process, and placed their jets and vents accordingly, the jets all pointing downwards and the vents upwards; the spouts, of course, led downwards. When all this was completed the next operation was the construction of the mould itself, together with the walls of the so-called pit, in which it was to be cast, not to forget the furnace to melt the metal.

The soil was so damp in Girardon's *atelier* that it was considered unwise to dig a pit for casting, as is the usual custom; so the plan adopted, and I believe for the first time, although it has often been done since, was to build a strong wall all round the mould and conduct the whole operation above the floor-level of the studio. This wall would rise to a height of three or four feet above the top of the mould, and the mouth of the furnace would have to be a little higher than that. The furnace, therefore, in this case will have been about thirty feet above the ground-level.

The construction of the mould was as follows: Three parts loam of Chatillon, two parts powdered crucibles, one part horse-dung. This mixture was mixed with white of egg and ground on a stone until it was of the smoothness and consistency of oil paint, when with soft brushes a first and very thin coat was given over the entire surface of the wax, jets and vents included. When this first coat was entirely dry a second was laid on in the same manner and also allowed to dry, and so in this way twenty-four coats were given and dried; after this the same mixture was beaten up with cow-hair and other layers added, until a thickness of about two inches had been reached. This required about forty coats.

As the mould could no longer be trusted to support itself, a sort of net, made of hoop-iron, was placed under the horse's belly and attached above to the irons that supported the core; a like bandage was put round the body of the king, and, indeed, wherever it seemed advisable to strengthen the mould. After this, fresh layers of loam were added to the mould, until it had received about 150 in all, and was about eight inches thick, or rather more. After the mould had been brought to this state, it was entirely enveloped in a lattice-work of bands of irons, shaped to the mould, and secured to the grating on which the latter rested. This lattice-work was again covered with loam, and in the case of the legs and tail of the horse a second lattice of iron was added, and covered with loam and terra-cotta tiles, in order that it might be the better protected from the fire. The mould was now about ten inches thick at the base, and seven or eight inches at the top. The next operation was melting out the wax, and firing or cooking the mould. This was a matter of very great difficulty, owing to the immense size of the mould, the largest in fact of which we have any historical record. The following was the plan adopted: A kiln, which the French call *le mur de recuit*, was built of fire-brick around the mould, rising from the flues which I have already mentioned as being below the statue. This kiln was shaped as far as possible to the form of the exterior of the mould, from which it was distant about eighteen inches, this being considered sufficient for the fire space. As the kiln was built up, it was filled above the flues with bricks laid in such a manner that there was a space of a couple of inches between each, and others laid above, so as to form a sort of open-work to allow free passage to the flames. After three courses of brick had been laid in this manner, the space between the mould and the kiln was filled up with broken pieces of brick thrown in loosely so as to leave ventilation for the fire. When the kiln had been carried above the level of the top of the mould and filled as described with broken bricks, it was covered-in at the top with a layer of clay about three inches thick, in which, however, several small chimneys had been made, without which the kiln would not have been workable.



Girardon's Statue of Louis XIV after casting and before the Gates [metal that solidifies in the vents and jets] had been trimmed away. From Diderot's "*Encyclopédie*."

The fire was now started in three flues on each side, and after twenty-nine hours two more were started, and so on, with others, until they were all in work. This firing was with charcoal, and was continued for nine days and nights, after which time the wax, which had begun to come away after the second day, ceased to flow. Of 5,668 pounds of wax which were used for this statue, 2,805 pounds were drawn, so that there remained absorbed by the mould 2,765 pounds to be evaporated and burned off before the casting could be made.

To the charcoal fires a few billets of wood were now added, and the heat gradually raised for the space of eight days more, after which time wood only was used, and the fires were well maintained for seven days. Then the whole of the interior of the kiln, being at a full red heat, the flues were closed, and the mould was left to cool for eight days, after which time it was sufficiently cool to permit the kiln to be taken down.

This account gives us nine days for drawing the wax, eight days for raising the fire, and seven days more to bring the kiln and its contents to the proper heat, and another eight days for the mould to cook after the kiln had been closed. In all, thirty-two days, and none too much when we remember the size of the casting; and here I wish to say that firing the moulds is the one great difficulty in waste-wax casting. You cannot fire too slowly. The mould and the core, to its very centre, should be brought to a good cherry red, but no more; neither should the outside be hotter than the inside. In order to arrive at this result, a gentle fire, long continued, is needed. A strong, fierce fire only injures and destroys the mould — cracking, tearing and warping it in every direction; over-firing is the cause of as many, if not more, failures than under-firing; and no fuel is worse to use than coke, on account of the great heat, and also of the sulphur it contains. A fire of soft charcoal, or of wood, is the best and safest.

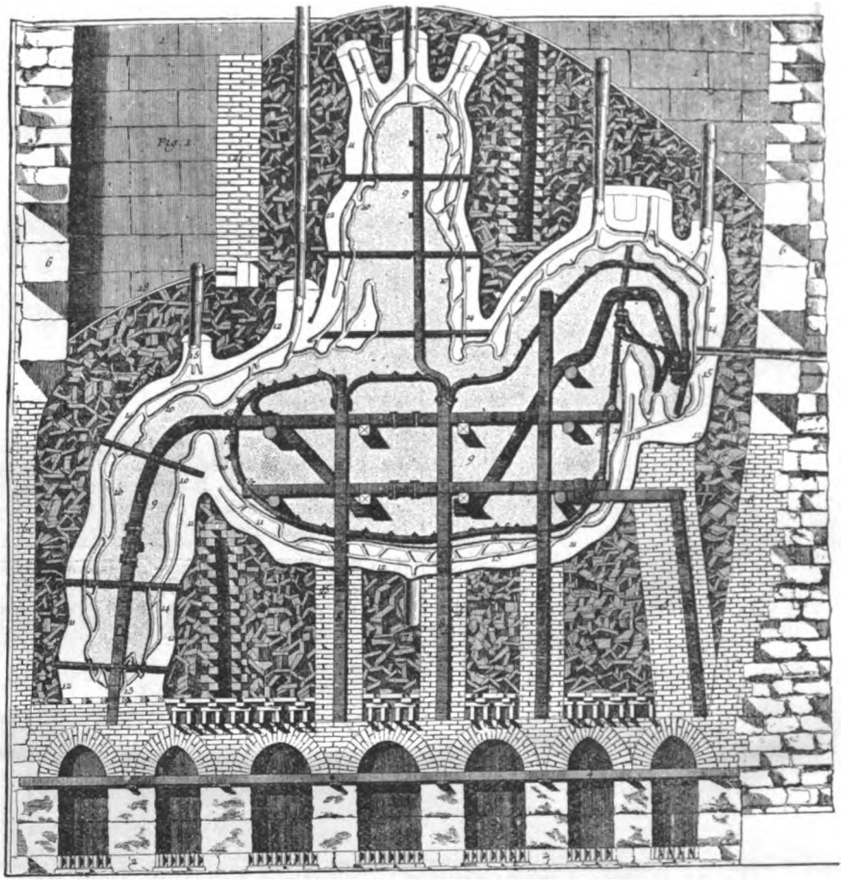
The mould being now properly cooked, the next thing was to remove the kiln, and everything else, and clear out the pit, so that it contained nothing but the mould. The spouts from which the wax has been drawn were now carefully closed with loam, and the earthing-up was proceeded with. The flues, which were directly underneath the mould, were fitted up solidly with masonry, and the pit filled-in with earth — thrown in to a depth of about six inches,

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and well rammed down in every part before another layer was added; and so on, until the highest part of the mould was reached. A small quantity of plaster was sifted amongst the earth thus used, in order that it might take up any dampness and prevent it from affecting the mould.

The next thing was the construction of the basin, or dam, to contain the metal when released from the furnace. This was made of an oblong shape, of beaten loam, the sides being bricked and plastered with loam. From the mouth of the furnace a trench led with a gentle fall into the dam, and from the bottom of the dam proceeded the three principal jets. The mouths of these three jets were funnel-shaped, and were stoppered with carefully fitted plugs at the end of long iron rods, so arranged that, by means of a lever, they could be simultaneously withdrawn at a given signal.

Sometime previous to the completion of these last operations the furnace was started, with a charge of 83,752 pounds of metal, being part old cannon, part ingots of red gun-metal, part yellow brass, and about 2,000 pounds of fine Cornish tin, besides a mass of old metal that had been used in the arsenal many years before. The fusion of this large charge took forty hours in this furnace — of which I am pleased to be able to show you some illustrations — after which it was tapped and the entire charge allowed to flow into the dam. The plugs having been withdrawn by means of the lever, the bronze went down quite quietly into the mould, rising in all the vents up to the level of the flooring, a sure sign of a successful casting. The weight of metal taken up in the statue, and its jets and vents, was about 60,000 pounds; the remainder was left in the dams. After four days the work of digging out the pit was begun, and the statue was found to be quite perfect. There only remained now to cut off the jets and vents, and to chase over the places where they joined the statue; also to remove the core, and, as far as possible, the iron also, through the man-hole at the back and the other smaller apertures that had been provided for that purpose. To close these holes, pieces had been made of wax, carefully fitted and then removed, and placed amongst the jets in such a manner that they should be cast at the same time as the rest of the work; after which repairs, the statue only required to receive a patina, and was ready for use.



Section of Mould and Kiln for casting Bouchardon's Statue of Louis XIV. From Diderot's "*Encyclopédie.*"

Such, then, is the history of the greatest piece of bronze casting of which we have any record in Europe, for although there are several other bronze statues that far exceed this in height, and, indeed, rival the colossi that were erected by the ancients, yet these were all cast in sections and fitted afterwards.

There is, I believe, no record extant of the casting of Le Sueur's fine statue of Charles I, which is a pity, for it would be very interesting to know if it is, as I suspect, a wax casting.

Chantrey, I believe, used to cast his own statues, and I have been assured that he used to cast them in piece-moulds made of plaster and brick-dust in equal proportions. I know that this method has been employed by sculptors, but it is more in the nature of a makeshift than a process to be recommended, since a good loam piece-mould will be more likely to give good results.

When piece-moulding for bronze with plaster brick-dust, the mould should be thicknessed up with sheets of tallow or dough rolled to the required thickness, and the core irons having been prepared and placed in position, the core, also of plaster mixed with brick-dust, must be poured in and allowed to set. After this the mould must be taken to pieces, and the core removed and thoroughly dried and baked, as must also be the various pieces of the mould. They do not, however, require the same degree of heat as in the wax process. After they have been well baked they must be put together, buried in the earth, and cast as soon as possible. The jets and vents are cut in the material of the mould, in the same way as in the ordinary loam piece-moulding.

Amongst other equestrian statues cast by the wax process, I may mention Louis XV, by Bouchardon, and the celebrated statue of Peter the Great, by Falconet. This last was cast by the sculptor himself, without the aid of a professional founder, and under very great difficulties. This casting is remarkable for being, in the forepart, where lightness was most essential, perhaps the thinnest casting for its size in existence. In our own day many fine equestrian statues have been produced in England and elsewhere. Marochetti, I believe, was the last sculptor in England who did his own casting; but I do not know if his methods had any particular interest.

Foley's statues, such as his General Outram, were all cast in pieces, by the usual loam process, which seems to me, when properly and skilfully carried out, to be sufficient for the purpose.

In this survey of bronze casting in Europe, I have been obliged to omit all mention of much admirable work that has been done in Germany, and in Holland and Belgium, in which last country I got my first lessons in bronze casting, in the studio and foundry of the Chevalier Louis Jéhotte, at Brussels, when I assisted him in modelling and casting the monument of Charlemagne, afterwards erected in Liège. This was entirely cut to pieces and cast by the loam process. In Italy they still, in spite of the great cost, keep to the wax process for almost all their public monuments, of whatever size; and I am pleased to show you one that was cast entirely at one pouring, about twenty years ago, by Papi, of Florence, for the sculptor Balzico.

I do not recommend the establishment of large foundries in England for waste-wax casting. It is essentially a process that should be used for the production of small, rather than large works; and although Papi cast one of my own works, of colossal size, by this process, I do not think that, as a rule, the game is worth the candle; and I should always employ the piece-mould, as being much cheaper and quite as successful. For work up to life-size, however, and especially for smaller work, where the touch of the artist is of great importance, I should always use the waste-wax process.

There is all the difference between a statuette cast from the wax by an artist and the same thing cast in a piece-mould in the ordinary way that there is between an original painting and a chromolithograph. The one may be worth more than its weight in gold, the other is hardly worth more than its weight as old brass. On the other hand, it is not the wax process alone that gives value to the work; the design may be admirable, and the artist amongst the greatest; but if he allows inferior workmen in a foundry to retouch the waxes and repair and chase up unsuccessful castings, then the work ceases to have artistic value, and is no longer an original autograph work, but simply a commercial copy.

It will be an excellent day for English sculpture, and I think that day is not far distant, when the public will insist on autograph work, in small bronzes at least. These may easily be cast with few appliances and in a very small studio. This is a bronze from the wax sketch of my marble statue of the Queen, which I cast in a corner of my own studio. It is left exactly as it came from the mould, and has not even received a patina; only the jets and vents were removed. I merely mention this to show that it may easily be done, and I hope the time may soon come when artists will again take their proper part in the advancement of bronze casting in Europe.

An Historic Bell. — The historic bell in the tower of St. John's Episcopal Church, Portsmouth, N. H., is to be recast, having recently been cracked. The bell was captured at Louisburg by the expedition under Sir William Pepperell. In 1806 it was recast by Paul Revere & Sons, of Boston, and has hung in the church tower since that time. — *Philadelphia Telegraph.*

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ASBESTOS.

NOTWITHSTANDING the wide distribution of asbestos, the only varieties which at present appear to demand serious consideration, from a commercial point-of-view, are the Russian, the South African, the Italian and the Canadian. The principal claim possessed by the Russian fibre to a place in the quartet is based on the enormous extent of the deposits which have been discovered in East Russia, beyond the Ural Mountains, and Russian Siberia. So far, their specimens have been of comparatively poor quality. The yield is used almost entirely in Europe, where it is mixed with the Canadian for spinning, making paper, and other purposes where an inferior grade can be utilized.

Before the development of the Canadian fields, the Italian asbestos was supreme in the market. For nearly twenty years Italy has been looked to for the best grades of the fibre. From a point on the northern mountain slope of the Susa valley is taken the floss asbestos fibre, the appearance of which in gas-stoves is so familiar. In the same locality is found a fine white powder of asbestos, which serves for paint and other purposes. The mining is carried on at a height of from 6,000 to 10,000 feet above sea-level.

But the Italian asbestos industry, once so important, is already on the down grade. The difficulties of mining are very great, and unduly increase the cost of production. The asbestos itself, judged by the latest standards, is of inferior quality; it is not easy to spin, and it does not pulp well in the making of paper. The best grade is extremely rare, and its cost of mining and transportation is prohibitive. The supply from the Italian mines is rapidly falling off. As a matter of fact, Canada contains the great asbestos region of the world, in the sense that while its mines are practically unlimited in productive capacity, the product is of a quality which fully meets the requirements of the newest and most exacting of the innumerable uses that are daily being found for it.

The process of manufacture is intensely interesting, more especially from the fact that as the industry is constantly entering upon novel phases, new methods of treatment and special machinery have to be devised. One of its special uses is for wall-plaster. This is a new application which will have a distinct effect in modifying the practice of indoor plastering. Instead of the ordinary tedious and elaborate preparation of studs and strips, and the use of inferior and dust-creating mortar, with its after-scoring, which is necessary to give cohesion to the final coat of plaster-of-Paris, a single coating of the asbestos is laid on. It has a glossy surface that will not crack, as, while firm, it is perfectly flexible. It can be put on the raw brick; and a room of which the walls have been built in the morning can, before night, have a smoothly finished interior surface, shining like glass and hard as a rock. A kindred application of asbestos is now coming into vogue in the shape of uninflammable decorations for walls and ceilings. These are used a great deal for the saloons of steamships. They are embossed in very beautiful designs, and can be treated with gold, varnish, lacquers or any other substance, for the enhancement of their ornamental effect.

Firemen clad in asbestos clothing and masks, as are those of London and Paris, can walk through the hottest flame with comparative impunity. Asbestos fireproof curtains have reduced the mortality of theatre fires in a very appreciable degree. In torpedoes, the difficulty of dealing with the charges of wet gun-cotton is overcome by enclosing them in asbestos, the employment of which has also, in a great measure, brought the dynamite shell to its present efficiency. Asbestos is made into a cloth available for aeronautical purposes. A balloon made of this uninflammable material escapes one of the most terrible dangers to which an ordinarily constructed balloon is liable. Probably one of the first applications of asbestos in this country was to roofing. To buildings covered with this material, the shower of sparks from a neighboring conflagration involves no danger. The fact that woodwork can, by its use, be made uninflammable has come to be an important factor in the insurance of buildings. One of the largest branches of asbestos manufacture is that of sectional cylinders for pipe-coverings, for retaining the heat of steam and other pipes, felt protective coverings for boilers, frost-proof protections for gas or water pipes, and cement felting, which can be laid on with a trowel, for the covering of steam-pipes, boilers or stills. In some of these cases, where it is only necessary to retain the heat, the asbestos is mixed with other substances; but where the protection must be fireproof as well, only asbestos is used. The utility of such covering is well illustrated in the heating system of railway-cars. The main pipe from which the individual cars draw their respective heat-supplies by side mains, if not covered with asbestos, would lose a large proportion of its caloric from the rapid motion of the car through the air. An interesting innovation in this class of manufacture is asbestos-sponge. It is not generally known that sponge has great powers of fire-resistance. The discovery was made accidentally not long ago, and the result was that a consignment of scraps of sponge picked up on the Southern coasts was ordered for experimental purposes. The sponge was finely comminuted and mixed intimately with asbestos fibre. The combination was found so successful for any covering which had to be fireproof as well as heat-proof that the material has become standard. Being full of air-cells, it necessarily makes an excellent non-conductor. Another very extensive department in asbestos manufacture is that of packings. Of these there are an infinite number of forms. In these days of high pressures and ocean records, it is of supreme importance to marine engineers that they should have jointing and packing materials on which absolute reliance can be placed. In order to meet modern exigencies every possible form of packing has been constructed, particularly with asbestos and metallic wire and with asbestos and rubber cores for gland packing. The making of asbestos paper varies from the building-up of the thickest millboard to the production of a writing-paper which, from its indestructibility, is invaluable in case of fire for preserving charters, policies, agreements and other important documents.

To the electrical engineer asbestos is absolutely indispensable. Many parts of electrical devices and machinery, and wires through which the electric current passes become heated, and were it not for the electrical insulation and heat-resisting qualities which asbestos possesses, the apparatus would be completely destroyed, particularly in the case known to electricians as "short-circuiting." For such purposes it has been found advisable to combine asbestos with rubber and other gums, and this combination is now used universally for not only electrical but also steam and mechanical purposes.

A considerable part of an asbestos factory is devoted to weaving, the asbestos being first drawn into thread for that purpose. Here again is an apparently endless diversity. There is the fireplace curtain-blower, which, with an automatic spring-roller attachment, takes the place in the frame of the fireplace of the less sightly sheet-iron blower; and filtering cloths for many purposes, from straining molten metal to clarifying saccharine juices in beet-root-sugar refineries. A cloth is made for straining and filtering acids and alkalies in chemical laboratories: this is especially useful when the liquid to be treated is of a caustic or strongly acid nature. The filter can be thrown in the fire, and after the residual matter has been consumed, the web is as good as new. For filtering purposes generally, asbestos has a unique adaptability, and in tropical countries it is held in grateful estimation as a cooler and purifier of water. The newest departure in the asbestos field is the construction of electrothermic apparatus. The heating effect of the electric current is utilized by embedding the wire in an asbestos sheet or pad. The pad is used by physicians and nurses for maintaining artificial heat in local applications, and is said to be already largely used in hospitals. Another application of the same principle is to car-heaters: a sheet of asbestos, with the embedded wires, is clamped between two thin steel plates, and the portable heater thus provided, or a series if need be, is connected to the car circuit quickly and easily. It gives an even and healthy heat and can be so regulated as not to overheat the car. — *George Heli Guy in the N. Y. Evening Post.*

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

R. C. CATHEDRAL OF ST. LOUIS, NEW ORLEANS, LA.

[Gelatine Print, issued with the International and Imperial Editions only.]

WHEN we had this negative made, we were under the impression that the building stood in its original condition, that is as the building was rebuilt in 1794, but, as appears by the letter published elsewhere in this issue, the façade was remodelled about the middle of this century at the expense of Madame Montalba.

R. C. CATHEDRAL OF SS. PETER AND PAUL, PHILADELPHIA, PA. MR. N. LE BRUN, ARCHITECT, NEW YORK, N. Y.

A VIEW of this building was published in our issue for April 25, '95, but, owing to the presence of heavy foliage, the standpoint had to be such that the great dome was wholly obscured by the pediment of the porch. For this reason we are all the more pleased to be able to publish this excellent measured drawing, prepared by Mr. H. M. Wirsing, a pupil in the Architectural Department of the Drexel Institute of Art, Science and Industry.

HOUSE OF W. B. BOURN, ESQ., SAN FRANCISCO, CAL. MR. WILLIS POLK, ARCHITECT, SAN FRANCISCO, CAL.

THE house will be faced with dark-blue clinker bricks, extremely rough, while the corners will be of red stock brick. The cornices, mouldings and ornamentation will be of brown sandstone that was brought here from England as ballast. The sandstone is of a peculiar grade of fineness and firmness, the same, in fact, of which Melrose Abbey was constructed 500 years ago. The roof tiles will be of the same dark-blue color as the body bricks. This is the first residence in San Francisco to be designed with the English basement plan. The main entrance being in this basement, it opens on each side into reception-rooms. At the end of the basement corridor is the grand staircase, with large windows on the landing. The balance of the basement is devoted to kitchen, servants' hall, laundry, pantry, storerooms, furnace-rooms, etc. The entire front of the main floor is a grand *salon*, a room 25 x 46 feet. There is also a large hallway on this floor, a dining-hall, library, conservatory, dining-room and pantry. The dining-room, library, conservatory and

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salon look out upon a large private garden. On the second floor are the bedchambers — five of them — each of which has connecting dressing and toilet rooms. There will be a handsomely treated hallway running the entire length of the second floor, upon which the chambers open. This will be finished in groined vaults or intersecting arches. In the attic are two guests' chambers and five servants' rooms.

SKETCH FOR A SUBURBAN RESIDENCE. MR. ISAAC S. TAYLOR, ARCHITECT, ST. LOUIS, MO.

A DESIGN SUBMITTED, UNSUCCESSFULLY, IN THE COMPETITION FOR THE INDIANA BANK BUILDING, INDIANAPOLIS, IND. MESSRS. MARSH, ISRAELS & HARDER, ARCHITECTS, NEW YORK, N. Y.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXIV: THE PARTERRE: PARK OF THE PALACE OF FONTAINEBLEAU.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXV: LA COUR D'ULYSSE: PARK OF THE PALACE OF FONTAINEBLEAU.

A GROUP OF WROUGHT-IRON FENCES.

[Additional Illustrations in the International Edition.]

PORTICO OF THE MUSÉE PLANTIN-MORETUS, ANTWERP, BELGIUM.

[Copper-plate Etching.]

ADDITION TO THE HOTEL SAVOY, LONDON, ENG. MR. T. E. COLLCUTT, ARCHITECT.

THIS plate is copied from the *Builder*.

DOORWAY, NO. 36 AVENUE HENRI-MARTIN, PARIS, FRANCE. M. CH. GIRAULT, ARCHITECT.

STAIRCASE AND ELEVATOR IN THE SAME HOUSE.

THIS, as well as the companion illustration, is copied from *L'Architecture*.

THE HALL OF THE DRAPERS' COMPANY, LONDON, ENG.

THE buildings of this Company, says *Building News*, are in the very heart of the City, close to the Bank of England in Throgmorton St., and the unique character of the premises is largely due to the small garden, with its mulberry trees, adjoining the offices, giving the name to the famous centre of the stock broking community known as Drapers' Gardens. The Great Fire of London stopped at Drapers' Hall; but the buildings, once the Earl of Essex's historic mansion, were entirely consumed. Jarman was the architect for the rebuilding, but another fire nearly destroyed the hall in 1774, soon after which the brothers Adam were engaged in its re-construction and repair. In this condition the buildings remained till rather more than twenty years ago, when Mr. Herbert Williams, the architect to the Drapers' Company, designed the present hall and adjacent drawing-rooms and other buildings, which are executed externally in Portland stone, and are treated in a sumptuous style in accord with the magnificence of the hall herewith reproduced after the *Building News*. A handsome winding staircase, enlivened by colored marbles and decorated by statues of Edward III and Philippa, leads to the reception-rooms and hall. The quadrangle and cloister round which the buildings are grouped make a special and pleasing feature with the tubs of laurel-trees which adorn the little quad. Over the arcades are sculptured representations of allegorical figures and groups by Mr. E. W. Wyon. The site of the buildings is that of a mansion belonging, as already stated, to Thomas Cromwell, Earl of Essex in the reign of Henry VIII. This house figured in Aggas's plan with four embattled turrets, and from thence the open country up towards Hampstead and Highgate could clearly be viewed and commanded by Cromwell, "Mayster of the King's Jewel-house." Upon his attainder, the property was purchased by the Drapers, and made their "common hall." Previously the Guild were housed in St. Swithin's Lane. The first charter of their incorporation dates from 1364, granted by Edward III, and in 1439 Henry VI conferred a fresh charter of more considerable privileges, as the Guild or fraternity of the Blessed Mary, the Virgin of the Mystery of Drapers. A ladies' chamber, always and still a feature with the Drapers' Company, was used solely by the sisters of the confraternity. Married ladies only dined in the hall, "a chekker chamber being for maydens" specially reserved. In 1515, a ladies' feast was held, including "brawn and mustard, capon boiled, swan roasted, pike, venison baked and roast, jellies, pastry, quails, sturgeon, salmon, and wafers and ipocras." The splendid feasts of the Drapers' Company have always been foremost in splendor, and the dignified clergy and conventual brothers usually figured among their guests, and, of course, the Lord Mayors, who often started their processions from the hall of the Drapers' Company. It is claimed that Henry Fitz-Alwyn, the first Lord Mayor of London (who was elected in 1191 and held office for twenty-five years), belonged to the Guild of Drapers. Stow and other writers say he was a Goldsmith. The Drapers' Company have many works of charity, and hold vast estates. Several females are free of the Company, and participate in its benefactions. Almost every modern educational movement has been aided by the Drapers' Company in nearly every trade. The charities of the Drapers' include Queen Elizabeth's College at Greenwich, several almshouses at Tottenham, Startford by Bow, Stepney, Mile End, Shoreditch, and Southwark, and in Surrey and Berks; the Green Coat School, the Tottenham Orphan School, and two girls' schools in Wales. Many pensions and scholarships are given by the Company.

NOTES AND CLIPPINGS

PRIVATE STREETS. — New York is peculiarly free from one annoyance that abounds in many other cities, namely, the private street. There is only one thoroughfare of any prominence which is private property in this city, and that is Thomas Street, which is part of the old New York Hospital site. Private ownership in it is still legally retained by stretching chains across the two entrances two or three Sundays of each year. — *New York Times.*

A WATER-INCASED PRISON CELL. — There is on exhibition in Boston a model of a cell for prisoners, from which a prisoner would find it practically impossible to attempt to escape without giving an alarm that would bring a guard rushing up to his door before either the lock on the door or the steel tubes of which the cell is composed were broken or even cracked. The protection is not afforded by electricity, although electricity plays a part in the device. The chief protective agent is water, which fills every length and every joint in the steel tubes forming the entire cell. The water is maintained in the tubes at a certain pressure, indicated on a gauge in the watchman's room, and the slightest decrease in pressure of this water, such as would be made by the cracking of a tube, so that no more than a cubic inch of water would escape, would release the pointer on the gauge, allowing it to turn slightly and thus make an electric connection with an electric bell. The bell then rings continuously until the circuit is broken by the watchman. At the same time that the bell rings on the annunciator, above is shown the number of the cell where the water is escaping from the tube. Unlike the modern cells that are made with solid steel bars, the floors and ceiling do not have to be made of steel plates — through which the criminal can often cut his way, or on which his movements in the cell keep up a continuous noise sufficient to make the cell-room too noisy for the watchman to hear the slight sound of a saw or an auger in a particular cell. This new cell is a cage. The sides, floor, ceiling and door are all made of steel tubes, set so closely together that they could not be sprung apart to any advantage. Even the hinges and the bolt on the door are filled with water, always ready to give the alarm if its pressure is changed in the slightest degree, yet inclosed in such a manner that the prisoner cannot make any attempt to break or cut his way out of the cell without changing the pressure. — *Philadelphia Evening News.*

AN IMPROVED DIVING-BELL. — Scientists in New South Wales are greatly interested over an invention by J. Vernon Israel, of Sydney, which may revolutionize deep-sea diving. On the 10th of June the diving-bell was tested in Sydney Harbor. Captain Bell, the United States Consul, who witnessed the test, says: "I arrived by invitation, in company with a number of scientists, off Bradley's Head. We had a number of bowlders on board to test the diving-bell. The machine was floating at the side of a schooner. It looked a good deal like a street-roller. On our arrival the three tons of steel were hoisted up by the tackle of the schooner. The owners, Dr. Barrington and J. Israel, then invited us to throw our bowlders overboard. This we did, and then examined the machine, which is not bell-shaped, but constructed on a different plan entirely. It is a cylinder 7′ 4″ in length, and of the same diameter. It is built of steel three-eighths of an inch thick. Inside this is a second cylinder of similar strength, but of lesser diameter by ten inches. The space between the inner and outer shell is used for filling with water to sink the machine, thirty-two gallons being sufficient, and for buoyancy when air displaces the water. The two men entered through a manhole on the top, and the cylinder was hermetically sealed. The order was then given to let go. So well adjusted was the cylinder that Dr. Barrington and his companion sported about on the waves for a while until they wanted to sink, when they opened a valve and the water rushed in, filling the space around the inner cylinder, and down they went until the register card indicated nearly twenty fathoms. We were all more or less frightened, and began pumping air to them at a furious rate, when a voice from the depths of the ocean sounded in our ears. It came from the telephone attachment of the machine. 'Too much air; do let up; you are creating such a current that we can't light a match to have a smoke.' In fact, the owners can sleep, eat and smoke while enjoying the wonders of the deep at 1,000 fathoms below the surface, if desired. Inside the compartment there is driving gear for working the motive wheels of the machine and the steering gear. For salvage work there are "grabbers," or pronged shovels, to be revolved to scoop up pearl shells and toss them into a receiver, which in its turn has to discharge into the inner spaces of the cylinder, to be finally handled by the divers and packed in the inner compartment. If the air-pump ceases to operate, the occupants of the cylinder have a supply on hand in chambers to last them for an hour, and, should their schooner get adrift, they can float to the surface by emptying their water ballast and ride the billows like a life-boat. The diving machine is to be taken to Torres Straits, off the New Guinea coast, and will be employed in bringing long-buried treasures from the bed of the sea. — *San Francisco Chronicle.*

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Additional: Central Dormer of the Hôtel de Ville, La Rochelle, France. — Entrance Porch to the American Surety Building, Broadway, New York, N. Y. — Castle Grove, Headingley, Yorks, Eng.: The Salon. — Detail of Arcading in Same Room. — Grand Staircase, Hôtel de Ville, Paris, France. 65
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THE New York *Evening Post* has an excellent editorial on the employment of experts in court, called forth by the inaugural address of President Wolcott Gibbs before the National Academy of Sciences, in which Professor Gibbs calls attention to the great and increasing necessity of proper regulation of scientific expert testimony. The editorial says, very truly, that, under the present system, experts are practically retained by the sides to the controversy in which their opinion is desired, and that their testimony is very apt to be so contradictory as to bring discredit on their science, as well as on them; and it adds that the best of the scientific men shrink, in consequence, from appearing as expert witnesses, so that the business of giving expert testimony before the courts has "in only too many cases," fallen into the hands either of "genuine scientific men, who are not embarrassed by too much delicacy, who find the employment profitable, and who take it up as a business," or of "men who have some scientific education, but no reputation," "chemists who are in fact discharged apothecaries' clerks, alienists who are really doctors without patients, mechanical engineers who have just graduated from a scientific school; here and there a really able man ruined by drink or cards." These individuals, according to the *Evening Post*, go about soliciting employment, and although they "do not get a great deal of work," "here and there they will get a fat fee for helping to send a sane man to an asylum" or "for assistance in breaking a will."

ALTHOUGH we do not dispute the existence of these delectable men of science, we are inclined to think that they do not play a very large part in judicial investigations, and that the *Evening Post* overlooks some of the real reasons why expert testimony is usually so unsatisfactory to the witnesses and the public. That expert witnesses are employed by one of the parties to the controversy is indisputable, since our system of jurisprudence provides no other way in which they can be employed; but that, in return for their fee, however large it may be, they, as a rule, make any statements, or express any opinions, that do not seem to them perfectly impartial, we do not believe, and we have had a tolerably extended experience in such matters. The real reason why the expert witnesses on the different sides of a case in court make such contradictory statements is, to put it plainly, that they have been purposely misled by the counsel. It is a maxim among lawyers never to put a witness on the stand without knowing what he is going to say, and the expert, whose testimony is particularly important, is, directly or indirectly, prepared for the witness-stand with special care. Lawyers often show extraordinary tact in managing such witnesses. If, by an artful description of the circumstances, perhaps with judicious suppression of some of them, they can excite the expert's sympathy for their cause, they are sure of blinding him to some extent to the merits of the other man's case, and this is likely to be the first manœuvre in the game. The next is often the presentation of hypothetical conditions, bearing so close a resemblance to the actual conditions that the expert, who supposes them to represent the case accurately, and bases his opinion on them, repeats the same opinion in court, without noticing the difference between the hypothesis on which it is founded and the facts. Indeed, the experts often hear nothing of the other testimony, and are, when they are put on the witness-stand, quite ignorant of any of the facts of the case except those which have been imparted to them, probably with more or less added color, by the counsel for the side which employs them. It is always difficult, and often impossible, for a scientific man, accustomed to keen observation and accurate statement, to make deductions of any value from such premises, and the lawyers, who, if they should by any chance comprehend his answers, will pretend to misunderstand them, if they are unfavorable to their case, in order to create confusion in the minds of the jury, do little to clear up the matter. We remember a case in which an architect was employed to testify on the side of the defendant. According to the story told by counsel, he had been hardly used, and the architect was quite willing to agree with him that the plaintiff's claims were unreasonable and unjust. The plaintiff's testimony, however, which the architect happened to hear first, showed the existence of facts which an expert could interpret only in one way, and a brief conference with the defendant's counsel resulted in the release of the architect from the case. We are quite sure that this is a common experience with experts — much more common than the attempts described by the *Evening Post* to earn fees by prejudiced or insincere testimony, and, in our opinion, nearly all the discordance of expert testimony in technical cases is due to the perversion of the facts presented to the expert outside of the court-room. We do not say that this perversion is always, or even generally, intentional on the part of counsel; but it is evident that a lawyer cannot observe or connect technical conditions in the way that an expert does, and his account of them almost inevitably gives a false impression, whether he wishes it or not. We once told a Court, after enduring a cross-examination in regard to our inferences from a long stenographic report of previous general testimony, that an expert was as necessary to observe facts as to draw inferences from them; and we are of the same opinion still. To get expert testimony of real value, the witnesses should make their own examinations, so far as possible. Evidently, an examination of this sort cannot easily be made, if either party opposes it, by the witnesses of the other party, and it is not uncommon for application to be made to the Court for an order, to compel the admission of experts to view the subject-matter of the dispute; but it would be infinitely better to have all the experts summoned by the Court, and clothed with power to make just such investigations as seem to them requisite, without depending upon the grudging permission of either party. This is the French way, and, in France, the expert, after making the examination, reports in writing to the Court, without knowing or caring, in most cases, how his report will affect the interests of the parties. Such a report is, obviously, of far higher value as evidence than the contradictory opinions of a dozen partisan witnesses, imperfectly acquainted with the facts, and intentionally misled by counsel; and it is very much cheaper; as, in France, the Court rarely sends more than one or two experts, and the cost of their services is included, at a stated rate, in the costs of the case.

THE Superintendent of Buildings for New York, Mr. Stevenson Constable, appears to be "under fire," as the politicians say. Not only has there been a mild demonstration of architects against him, for his alleged delay in examining plans, but the Central Labor Union has seen fit to bring "charges" against him for allowing improper material to be used in a certain building, and for employing boys as inspectors. Probably no one who understands the necessities of labor leaders views their opinion on any subject as being wholly disinterested, and in this case the "charges," which Mr. Constable meets by saying simply that his Department had already applied to the courts for an injunction to stop the work on the building in question, and that the "boy inspectors" in the Department were chosen under the Civil Service rules from candidates who were certified to have had ten years' experience, are shown to have had a purpose by the official statement of the work of the Department during the first six months of the present year, in which the reason for

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the desire of a certain class of builders and real-estate owners to get rid of Mr. Constable are clearly evident. From this statement, which is compared with the records of the Department during the first six months of 1894, the last year of the old régime, it appears that about three times as many unsafe buildings have been examined and reported upon this year as in a corresponding period under the easy-going old system; nearly four times as many notices have been issued to owners, the numbers standing at about seven thousand in the first half of 1894, and nearly twenty-eight thousand this year; fifteen hundred and seventy-seven unsafe buildings have this year been taken down or made safe, against six hundred and three in the first six months of 1894; seven hundred and fifty-seven defective passenger elevators have been reported, against fifty-four in 1894, and six hundred and seventy-one have been made safe, against forty-nine in 1894. Besides all this, nearly ninety-one thousand examinations of iron and steel have been made so far this year, as compared with virtually none in 1894, the examinations of structural metal under the old system not having been considered of sufficient consequence to be recorded.

IT is obvious that the people who get a living by making cast-iron columns out of a mixture of metal and dirt, and compound structural steel members out of short pieces welded together, or attract tenants by putting in a cheap freight machine, and calling it a passenger-elevator, find inspectors and superintendents who persist in this sort of inquisition absolutely unendurable, and it was certain, from the time that Mr. Constable began to show how he understood that his office should be administered, that before long a concerted attempt would be made to force him out of it. What the next move will be in the struggle between selfish interests and the public safety it would be hard to predict, but, whatever may happen, the architects should stand firmly by Mr. Constable in his present difficulties. All experienced members of the profession will agree that an efficient and honest administration of the building-laws is an invaluable aid to decent professional practice, while a loose and slipshod administration encourages the ignorant and dishonest architects, at the expense of the honorable ones. Many a so-called architect, without skill or character, gets a good living in cities where the building-laws are carelessly or corruptly administered, solely through his reputation for "influence" with the Building Department, that is, for his ability to save money to his employers by violating the building-laws, concealing the violation by the trick of changing the plans after they have been approved, or by direct or indirect bribery of the inspector, or by some other discreditable means; and the work that these men do is just so much taken out of the hands of the decent architects, who, as the owners know, will not under any circumstances be guilty of such proceedings. Where the administration of the law is efficient and honest, the changers of plans and bribers of inspectors have little scope for their peculiar talents, and owners, finding that they cannot save any money by tacitly conspiring to violate the law with people who have no scruples about serving them in that way, conclude that their best policy is to put their affairs into the hands of architects whose conscientiousness cannot be questioned.

ARCHITECTS who practise in New York will do well to note that the fee demanded by the city for the use of space under sidewalks for vaults has been raised from seventy-five cents a square foot, the figure at which it has remained for many years, to two dollars. The use of such vaults is now so widely extended that, as the Assistant Commissioner of Public Works says, the city ought to get a larger income for them, and he has accordingly bethought himself of the plan of raising the price to the limit allowed by law. With the wide sidewalks common in New York, the extra cost of a vault in front of a large store will be a very appreciable item, and architects will need more than ever to ascertain their clients' wishes in the matter before laying out their plans.

AN interesting case has come up for the New York courts to settle. Fourteen years ago, the Commissioner of Public Works of New York granted permission to a certain Safe Deposit Company to build vaults under the street adjoining its building, on the corner of Fifth Avenue and Forty-second Street. The vaults were built, and, as it appears, now come in the way of a new water-main which the city is laying through Fifth Avenue. Naturally, the Safe Deposit Company does not wish to have its vaults interfered with, and the city does not like to have to divert its water-main, or to pay the company the value of its vaults. As the vaults are there, and the company can show the permission of the Commissioner to place them there, it would seem as if it had the best of the controversy, but the city claims that the Commissioner had no authority to give such permission, and will try to prove this in court. As we have often pointed out, the powers of public officers are limited by law, and any person who puts faith in their promises or agreements on behalf of the public body which they represent, without ascertaining whether they are legally authorized to bind that body by such promises or agreements, does so at his peril; so that it is by no means impossible that the company may be obliged to give up its vaults. It must, however, be said that the doctrine of the lack of authority of the Commissioner of Public Works over the space under the streets will strike architects as new. The City of New York has always assumed a control over the space under sidewalks and streets resembling private ownership, charging an arbitrary price per square foot for the use of such space, just as a private owner would sell a strip of adjoining land, reserving the right of passage over it. Although, as a rule, sidewalk vaults extend only to the curb, there are many in the lower part of the city which extend beyond the curb, and if the Commissioner, in 1882, simply followed a long-standing precedent in granting the use, in consideration of a payment of money, of space under the street, it is difficult to see how the city can now effectively repudiate his action.

THE *Engineering Record* is quite unhappy because the City of Brooklyn has, by advertisement, invited engineers to submit plans for a drawbridge over Newtown Creek, including calculations of weights and so on, reserving the right to reject all the plans, and promising nothing definite in the way of employment or reward for the author of the best one. The *Engineering Record* thinks this is conduct quite unworthy of the City of Brooklyn, and hopes that no engineer will take any notice of the invitation. It is hardly necessary to say that we sympathize entirely with these sentiments, but one cannot help being a little amused at the dismay with which engineers view the sort of treatment which architects have had to put up with almost everywhere, until very recently. To the *Engineering Record* it seems incredible that the city authorities should expect competent engineers to go to the trouble and expense of testing the ground, and making their calculations, and devising a scheme for a costly drawbridge, in return for the bare possibility of being employed to carry out their plans; yet this is just what county commissioners, and the officials of second-rate towns, still imagine to be the ordinary occupation of architects. In regard to the latter, they are becoming gradually enlightened, through the repeated refusals of the decent members of the profession to engage in any such speculations, and the engineers will do well to reject invitations of this sort unanimously and decidedly at the outset, in order that they may not be led, through a want of resolution at the start, into the slough of disappointment and deception from which architects, after many years of suffering, are now slowly extricating themselves.

THE competitions for the two palaces in the Champs-Elysées, for the Paris Exposition of 1900, have been concluded, with the result that a large number of prizes have been awarded, but none of the designs will be carried out without change. Instead of adopting any of the designs, nearly all the architects who received prizes in the competitions have been employed to coöperate in the execution of the work, under the general direction of M. Bouvard, the Architect-in-Chief to the Exposition. This arrangement appears to be a French adaptation of the plan pursued at Chicago, of committing the building work to a considerable number of first-rate architects, under the general direction of a competent chief; and if the result in Paris is half as successful as it was at Chicago, the artistic world will have reason to rejoice. It is worthy of notice that seven or eight designs were thrown out of the competition, because they exceeded the limits prescribed; and of the authors of these plans, some of whom have a high reputation, only one appears in the list of those to be employed as assistants, the French having a distaste for carelessness in such vital matters which might with advantage be imitated elsewhere.

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GERMAN CASTLES.[1] — VIII.

THE PALACE.

IN the preceding descriptions of the main types of German castles, the general aspect of the exterior of palaces was dwelt upon. A word now in more detail as to the various conspicuous parts and members of façades. One of these, at least, may be pronounced preëminently German, as it appears in the architecture of this country in more variety, and with greater persistency and ubiquity than it does elsewhere.

This prominent feature is the gable. As every illustrated history of German architecture gives numerous specimens of it, I have chosen for an example the new restorations on the Royal Castle in Dresden (Fig. 55) which, being but just completed, have not yet found their way into many publications.



Fig. 55. New Facade of Royal Castle, Dresden.

The position and style of these Dresden castle gables, as it will be observed, are late Renaissance. The gables of mediæval castles are found on the *ends* of buildings or in the form of small roof gables, containing not more than a single window or two, as in Burg Enn, Figure 56. The gables of the elder seat of the Saxon princes, the Albrechtsburg in Meissen, which is a work of the transition period between Gothic and Renaissance (1470–1525), resemble hall dormers, two stories in height: for there are but two windows embraced within the roof projection, one large painted window below, and a small rectangular one above. Prominent, large gables, placed as is the case in the Dresden castle, in the middle of the broad side of a palace, accompanied by companion gables at the ends of the roof, are one of the latest fashions of the sixteenth century in Germany which was resorted to after every other combination and placement of this darling *motif* had been tried. In another Saxon palace, the stair-tower itself which occupies the middle space of the court façade, was crowned successfully by a storied gable, (*vid.* Illustrations, Fig. 57 Schloss Hartenfels). For a space of three hundred years or more, in fact, or from the fifteenth to the eighteenth century, gables were seldom wanting in a palace front or ends, and their number and diversity throughout the country is a matter of recurring interest to every student. Not all the most picturesque and beautiful examples are to be found in Lübke and Dohme and the other popular illustrated works on German architecture, and the traveller, in consequence, is apt to have

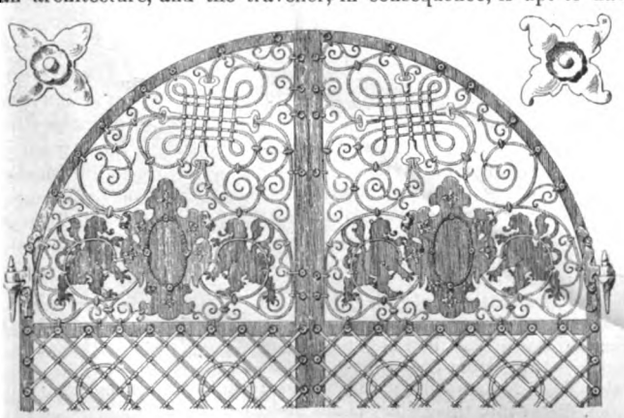


Fig. 63. Grille at Foot of Stair-tower, Schloss Hartenfels.

no thrilling pleasure so often as the coming upon unknown specimens of gables of uncommon fancifulness or merit in design.

Gables compose the chief decoration of the palace façades of a majority of the castles in Germany; but only the chief ones. There are other single parts which boast likewise of unusual embellishment, if the structure dates from the Renaissance — for the burgs of mediæval construction, which still survive, are mostly quite plain; they charm the eye through the picturesqueness of their sites and the irregularity of their roof lines. Eighteenth-century palaces, on the other hand, are distinguished by not having a few parts merely decorated, and the rest left crudely massive, as was the case in the seventeenth century, but by the distribution of ornamentation over the whole of the façades. While as for modern palaces, they are generally copies of old ones or combinations of old styles.

Turrets, while somewhat more rarely found than gables in rural castles in Germany, come next to gables in frequency in old town castles. In country castles they hang high aloft on the corners of the roof, on towers (see Burg Enn, Fig. 56 and Fig. 58, Schloss Neuenstein), or on the ends of the palace (Fig. 59 turret windows of the Schloss Hartenfels). In city castles they serve more the purpose of bay-windows, and their situation is favorable for overlooking the populous streets; whereas the lofty post of the country turret is that of a lonely outlook. The one speaks of watching; the other of trivial peering. And of course the oldest site is that which answered to the earnest need of castle-dwellers, not to one of their frivolous occupations. Yet, while this disposition of turrets is true in the main, so true as to be striking, and being capable almost of serving as a rule; still, it is equally true that you find turrets occasionally quite differently disposed, as the lofty adjuncts of town palaces, for instance, while the low ones form the adjuncts of country castles. Occasionally they project from the middle of buildings, and, indeed, almost anywhere. A glance at Figure 55, the Royal Castle in Dresden, will show a small turret on the ground, jammed in between the old (plain) portion of the palace façade and the new restored wing.

Staircase-towers are frequently so small as to come under the designation of towerlets. In Neuenstein, near Oehringen, an ancient seat of the princes of Hohenloh (Figure 58), there are turrets flanking the portal of the palace, and newel-staircase towerlets in five or six other different parts of the building. The like disposition of these miniature towers, most of which are built half in and half out of the wall, is not rare in old seats. When in the course of the development of construction, flanking door-turrets were withdrawn within the palace, they served as the original form of the two-fold, right and left hand, stairways.

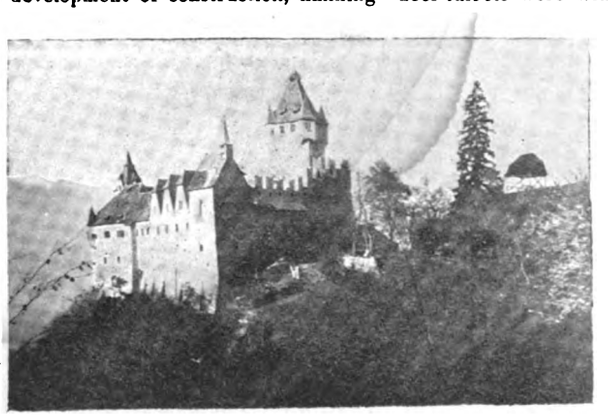


Fig. 56. Burg Enn, showing early Form of Gable.

The frequency of the other little newel-staircase turrets suggested, in their turn, the adoption of step connections between rooms lying one above another, which is so very frequent down to this day, in

[1] Continued from No. 1060, page 28.

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German castles, and so rare, for example, in America. When turrets designed especially for the purpose are lacking, then staircases are hollowed out in the thick walls of old castles. In newer palaces

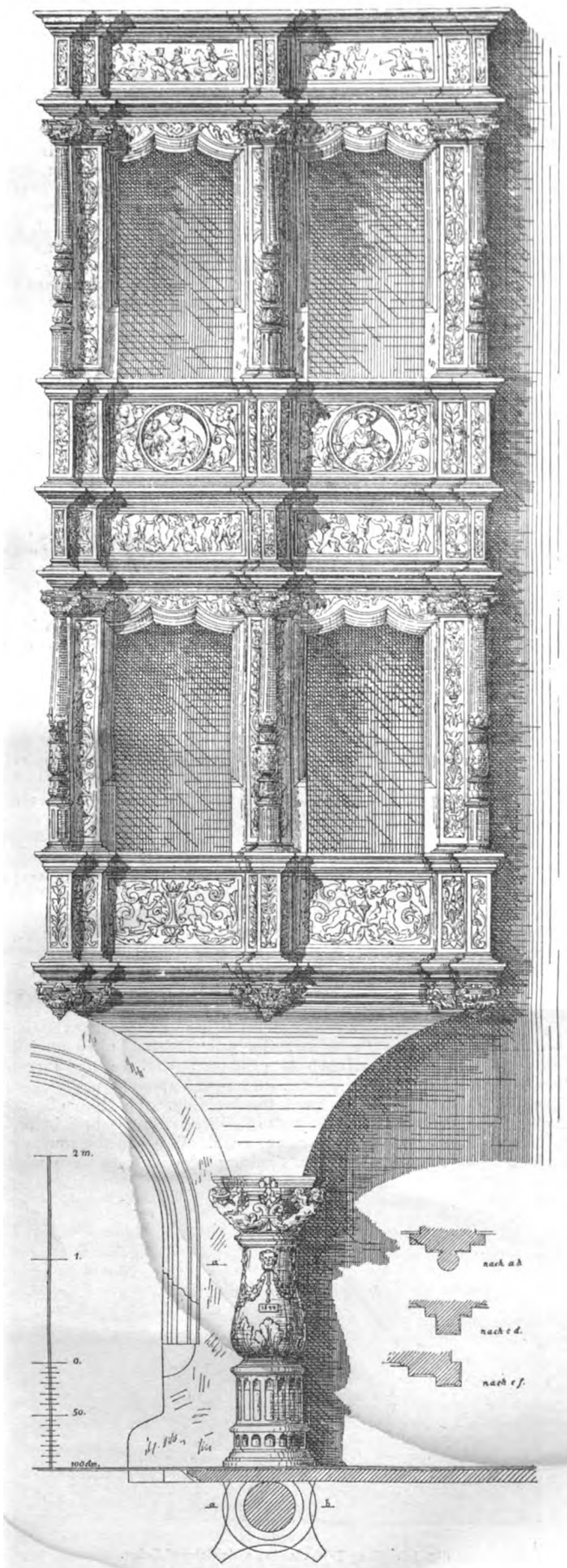


Fig. 64. Oriel from the Chapel of Schloss Hartenfels, Torgau.

where this is impracticable, spiral stairs are constructed of iron, and stand often quite open on all sides, in one end of a room. It seems that despite the many generations that have gone by since the introduction of interior corridors and stairways, still the old, traditional use of turret steps will not expire.

In all old castles which have not been renovated past recognition, stairway-towers form most important and beautiful parts of palaces. They are run up anywhere where convenience suggested in the very oldest burgs. Then they came to be relegated to the four corners of the court (Fig. 36); and, finally, in the sixteenth century, to where the front entrance of the dwelling-house has ever since generally been put, in the middle of the façade.

I choose for an illustration of this last-mentioned kind of tower, the finest specimen, perhaps, in Germany; the stairway tower of Schloss Hartenfels, at Torgau in Prussian Saxony. Figure 57 [Illustrations] is a front view; Figure 60, a side view; Figure 61, the ground plan. *A* of Figure 61 is a sectional drawing taken at the height of the balustered landing on the top of the rectangular foundation. The landing is reached from the sides by flights of nosed steps. The stair-tower proper rises from this landing, in the form of six pilasters, held together by the spiral sides of the winders. *B* is an enlarged design of the ground plan of one of these pilasters.

The open spaces between the pilasters are lofty and form five round-arched spaces, of which the two next the façade wall are crossed by horizontal fragments of the banister and three others by slanting fragments. These banisters divide the slender-looking airy tower into two stories, capped by a third story, somewhat lower, and a storied gable; the lower third story appearing as an entablature to the semicircularly grouped pilasters supporting it, while the gable crowns the forehead only, not the sides of the projection.

The whole of this tower stairway is richly decorated save the rectangular base. The stone sculptures of the balustrade, the pilasters and banisters are chiefly vegetable ornamentation interspersed with figures, masks, medallions and heraldic coats-of-arms. (Fig. No. 62.) Iron grille-work fills up the bases of the top-story windows and the transom of the door in the foundation at the front. Figure 63 shows this transom grille.

A kind of turret that grew out of the mediæval palace chapel choir, a very early example of which was given in Figure 28, in No. 842 of the *American Architect* in the course of the description of the chapel in Burg Trifels, and which developed during the Renaissance into a two-story bay, is found also in Hartenfels, projecting from the chapel wall, supported by a short, attached baluster column (Figs. 64 and 65). This turret was completed in the year 1544 A. D., and was carefully restored in the middle of the present century, at an expense of twenty-six hundred dollars. The chapel to which it belongs is historical, it being the *first Protestant chapel in the world*. Luther himself dedicated it, in the year of its completion, at the invitation of Elector John Friedrich, of Saxony, one of the earliest friends of the new religion. Luther's wife, Catherine von Bara, lies buried in the town (Torgau) church, near the castle, a church, which, in Luther's days, was connected with Hartenfels by a covered gallery. The two stories of this beautiful turret is a feature not without significance, for they indicate a very old custom among the feudal aristocracy of the land of dividing their chapels so as to separate the family from the menials of the household. Thus very commonly the chapel floor is on a level with the ground-floor of the castle, the gallery with that of the second story. Hence, while the household servants enter from the court-yard, their honors admit themselves from their chambers or the *salon*, direct into the gallery boxes or balcony.

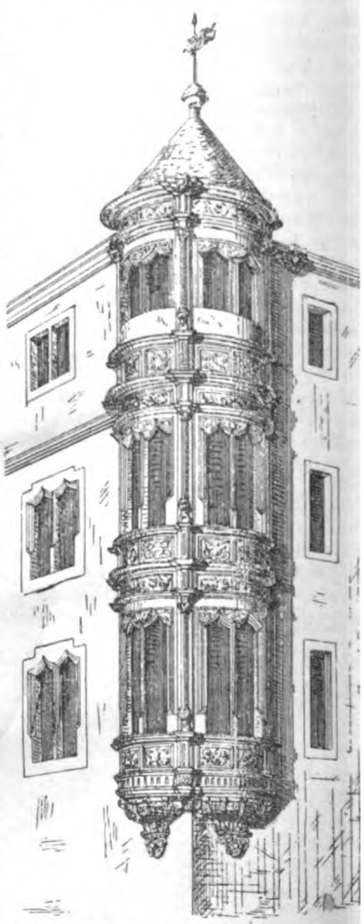


Fig. 59. Angle Turret, Castle Hartenfels, Torgau.

L. von Krockow.

(To be continued.)

Bells and Thunder-storms. — In the Swiss Canton Wallis the mediæval custom still exists of ringing all the church bells to avert an impending thunder-storm or untimely fall of snow. — *N. Y. Evening Post.*

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L'ENFANT AND THE PLANNING OF WASHINGTON.

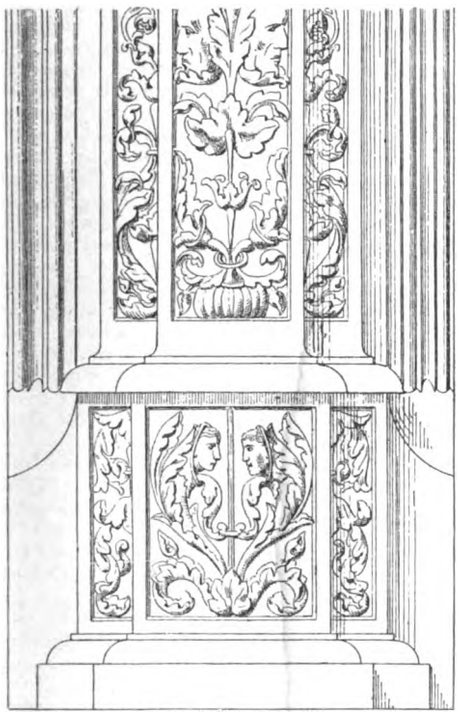


Fig. 62. Pilaster Base, Staircase Tower, Schloss Hartenfels.

JUNE 4, 1825, Pierre Charles L'Enfant died. "He had been educated in the best military schools of France, and with the first guns of the Revolution had hastened, like so many other gallant Frenchmen, to the aid of the oppressed Americans. He did excellent service, too, in teaching the latter how to plan and rear fortifications, and in this service attracted the attention of Washington, who caused him to be appointed major of engineers. Later, he had remodelled and fitted up the City-hall in New York for the use of the first Congress, and later still, the Federal House in Philadelphia, in a manner to win golden opinions from all sorts of people. To him Washington turned for the plan of the grand city he had in view. L'Enfant, for his part, seems to have realized that this was the opportunity of a lifetime; that if he proved equal to the occasion, his fame was secure. All through the spring and summer of 1791 he brooded over the plan. One point was quickly settled in his mind — he would not plan for thirteen States and three millions of people, but for a mighty republic of fifty States and five hundred millions. In his boat on the broad bosom of the Potomac, from the heights of Georgetown, and from the opposing hills across the Amacotia, he studied the features of the site. The old palace of Versailles in La Belle, France, that he had known as a boy, came frequently into his thoughts during these musings. . . . Often, too, did he recall the grand old forests of Compiègne and Fountainbleau, with their long avenues meeting at *carrefours*, and increasing in number according to the importance of the junction. Quite early in these reveries, April 4th, he writes a letter to Jefferson, asking for plans of some of the grand cities of Europe, such as London, Paris, Amsterdam, Naples, Venice, Genoa and Florence. He disclaims any intention of imitating, but observes: 'I shall endeavor to delineate in a new and original way the plan, the contrivance of which the President has left to me without any restriction whatever; but,' he adds, 'the contemplation of what exists of well-improved situation, even the comparison of these with defective ones, will suggest a variety of new ideas, and is necessary to refine and strengthen the judgment.' Jefferson furnished the maps with the remark that they were 'none of them comparable to the old Babylon revived and exemplified in Philadelphia.' But the engineer did not agree with him. Philadelphia, he observed, was laid-out in squares, like a chessboard; he thought that three or four great avenues, run obliquely, would relieve the monotony by introducing occasional curves and angles, and would also facilitate communication. He, therefore, combined both features. Choosing Capitol Hill as a centre, he first laid down streets parallel to it, and running due east and west. These were named after the letters of the alphabet, A, B, C, and so on. Then he drew another set of streets running from north to south, and intersecting the lettered streets at right angles, and which were distinguished by the numerals, 1, 2, 3, etc. Lastly, radiating from the Capitol and other public buildings, he laid-out magnificently wide and straight avenues, cutting the checker-board at every variety of angle, and creating those squares, circles, triangles and parallelograms which eighty years later were used to such advantage in the renaissance of the city, and which, with their beautiful growth of trees, render Washington the most picturesque city on the continent. The defect of the plan lay in doubling the names of the streets, and in creating too many of the avenues, both tending to confusion.

"In making these, however, the engineer had an ulterior object in view — he wished to connect outlying points of his plan with the Capitol, the President's House, and other public buildings, and to create vistas which they should fill, so that in whatever part of the city the observer should be placed, his eye, sweeping down the avenue, should rest on the imposing pile of the Capitol, the Monument, the Treasury or some other public edifice. There were some sixteen of the avenues in all, each named after one of the sixteen States that, in 1800, formed the American Union. These avenues are from 160 to 130 feet wide, while none of the streets are of less width than 90 feet. Ample provision was also made for public parks and gardens, not all of which has been utilized. In the original plan the Capitol grounds extended to the Potomac, as did also those of the President's House. The city, as originally laid-out, extended from northwest to southeast about four and one-half miles, and from east to southwest about two and a half miles, and included about seven thousand one hundred acres. It was a drive of fourteen miles around it; there were sixty-five miles of avenues and one hundred and ninety-seven miles of streets.

"When the plan was completed, the commissioners demanded it in order to have it engraved and published, but L'Enfant declined to do this, alleging that, if published, the plan would be made use of by speculators to purchase the best locations in his 'vistas and architectural squares, and raise huddles of shanties which would permanently disfigure the city.' When this refusal was reported to Washington he dismissed the engineer March 1, 1792, and appointed Andrew Ellicott in his place, who made a plan of close imitation to L'Enfant's, which was published late in 1792 and widely circulated. In the Congressional Library may still be seen L'Enfant's original plan, carefully secluded by him during his life, but secured by the Government after his death — a torn and discolored paper, yet giving proof of having once been an elaborate and elegant design. . . . His subsequent fate was a sad one, and marks alike the limitations of genius and the ingratitude of republics. . . . He was buried in the garden of Chellum Castle (near Bladensburg, Md.), and his grave is marked for remembrance only by a tall cedar tree and fragrant beds of myrtle. There is neither stone nor inscription — perhaps none is needed, for so long as time endures the beautiful city that he planned will remain his grandest monument and noblest epitaph."

CHARLES BURR TODD.

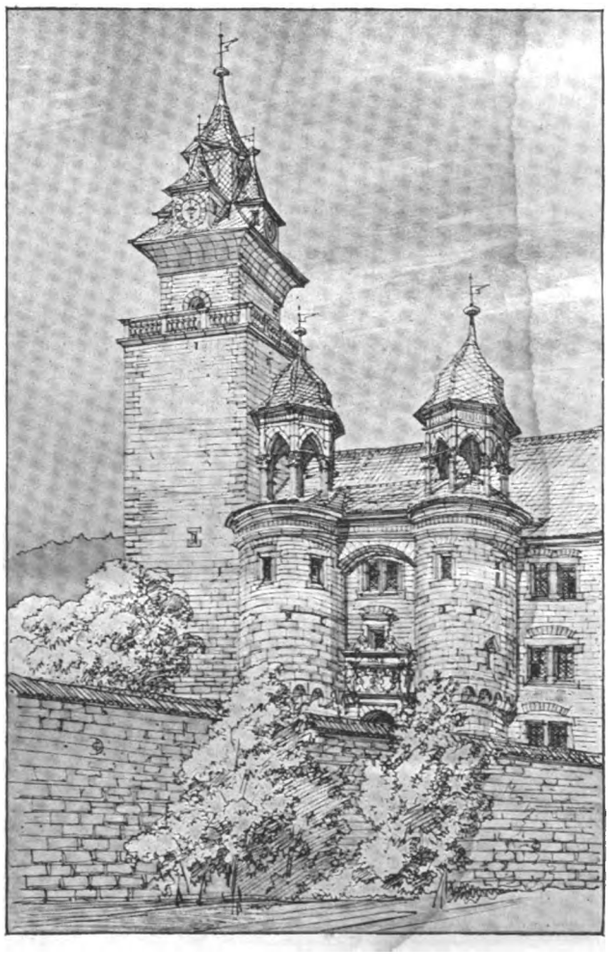


Fig. 58. Schloss Neuenstein, near Oehringen.

CAPACITY OF ST. PETER'S. — It needs fifty thousand persons to make a crowd in St. Peter's. It is believed that at least that number have been present in the church several times within modern memory; but it is thought that the building would hold eighty thousand — as many as could be seated on the tiers in the Colosseum. Such a concourse was there at the opening of the Œcumenical Council in December, 1869, and the two jubilees celebrated by Leo XIII; and on all three occasions there was plenty of room in the aisles, besides the broad spaces which were required for the functions themselves. — *Marion Crawford in the Century for July.*

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PARIS

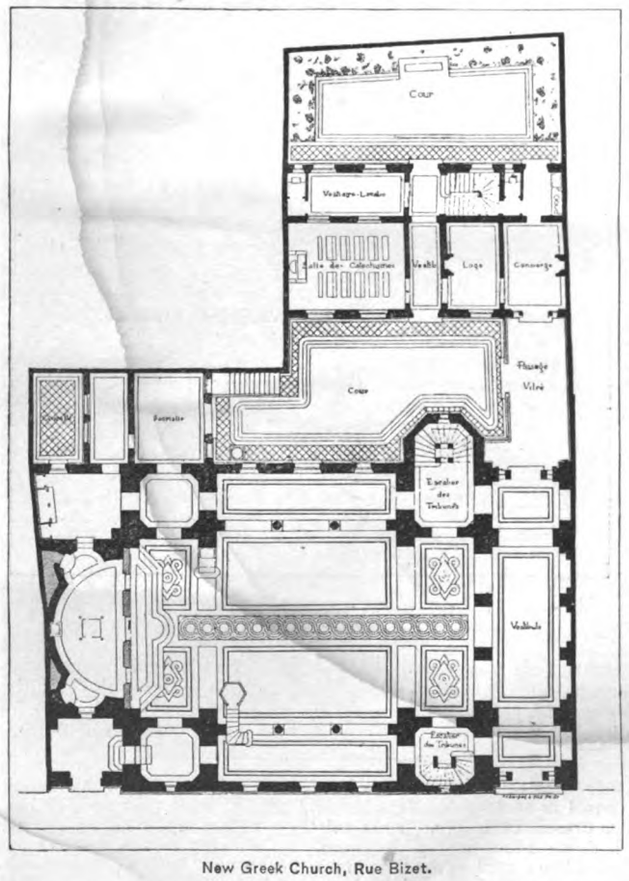
CONGRESS OF FRENCH ARCHITECTS. — THE NEW GREEK CHURCH. — PRINCE ROLAND BONAPARTE'S PALACE. — THE MEDALS.

EVERY year in the month of June French architects assemble in congress to study the questions that interest the profession, its duties, its guaranties, its future. Organized by the Société Centrale, each Congress addresses itself to the provincial societies. Committees are appointed to study the questions set down for consideration of each meeting, works that present special interest are visited, special conferences are held, and at the end of a week well occupied and interesting takes place the impressive ceremony of distributing the rewards decreed by the Société Centrale to those architects who have most distinguished themselves by their work, and also to the most deserving of the contractors and their workmen.

This year the matters brought up for consideration were: Hygiene, Fees, Social Economy, Public Competitions, Building Laws, and the Protection of the Interests of Architects. Moreover, discussions took place as to the rights of the owner in the specifications, drawings and agreements that constitute the contract negotiated by the architect between owner and contractor. These different proceedings take a long time and much work and their results can only be known later. If it shall appear worth while, I may return to this matter later, but to-day I mean to write concerning those new constructions that earned the admiration of those who attended the Congress.

Among the most important and most artistic must be named the Greek church built by M. Vaudremer, and the hôtel for Prince Roland Bonaparte designed by M. Janty — of this last I formerly wrote in connection with the *Salon* of the Champs-Elysées, where the drawings for the building attracted much attention.

Here the artistic conscientiousness and real worth of M. Vaudremer is well known. His church at Montrouge stands a model amongst modern religious monuments: his *lycées* have shown his ingenuity and his great skill in producing a decorative architectural effect through the simple and logical use of his materials. In the



New Greek Church, Rue Bizet.

Greek church lately built in Paris, M. Vaudremer seems to have united all those qualities which make him one of the greatest architects of our age. The aspect of the exterior is very simple and the façade, standing as it does between two *maisons à loyer* and fronting on a rather narrow street, seems to promise only a large chapel or a moderate-sized church. But at the very entrance, in the vestibule itself, one is seized with admiration on seeing the grandeur and richness of this architecture, carefully studied as it is in the minutest detail. This little marvel has been constructed at the cost of a private gentleman, M. Schillizi. The church consists of a nave and side aisles, above which run two galleries, while a third is arranged above the vestibule, facing the altar. A dome crowns the centre of the building. The gallery staircases, built in the piers which support the dome, are arranged in openwork cages and produce a most charming effect. Between the nave and altar rises a white marble portico, finely carved and closed at the centre with a gilded bronze grille, the side openings being closed by bronze doors of admirable workmanship. The appearance of the whole makes it a very jewel wherein the gilded bronze enhances the brilliancy of the marble. Everywhere throughout the nave, galleries, staircase and dome the surfaces are decorated with paintings, some merely accenting the construction by means of fillets, bands, volutes and friezes, while others are purely decorative or symbolic, representing certain sacred personages at a large scale and treated on a gold background in a very archaic manner by the artist, M. Lamerre. The effect is incredibly rich, though the forms are always simple and the lines always pure.

It would seem that on leaving such a building as this a modern hôtel must suffer by comparison. Nevertheless, the members of the Congress experienced a feeling of admiration, though of quite another kind, on visiting the hôtel of Prince Roland Bonaparte. This hôtel, or rather palace, is situated near the Trocadéro between the Avenue d' Jena, on which it fronts, and the Rue Fresnel, whose grade is fifteen metres below that of the avenue.

M. Janty, the architect, has taken admirable advantage of this enormous difference of levels, though it threatened the greatest difficulties.

About a great court, opening on the Rue Fresnel by a grand arcade, he has arranged the stables, coach-houses and servants' quarters, all in the height of these fifteen metres. Above this court he has suspended a second one, wholly floored with glass, the level of which is at the grade of the ground-floor of the hôtel itself and the Avenue d' Jéna. Around this second court are ranged the galleries of the library and the Prince's own working-quarters, which take up almost half of the total superficial area. In truth, Prince Roland is a man of learning and is deeply interested in ethnographical studies, and his private library is more valuable than many public and official libraries. The hôtel is separated from the Avenue d' Jéna by a small court-yard, at the left of which stands the lodge of the *concierge*.

Between two slightly projecting wings runs a peristyle, whose columns support a balcony at the first-floor level. Passing under this peristyle at the centre, one enters a wide vestibule continued by a vaulted gallery to the central rotunda, at the left of which ascends the great staircase. At the left of the vestibule, a waiting-room gives access to the office of the secretary; a corresponding waiting-room on the right gives access to the smoking and billiard rooms. Just before reaching the rotunda, one finds a private staircase at the left, which ascends to the private rooms above. Ranged about the glass-paved court, in two stories, are the various departments of the great library, including store-rooms, historical museum, *salle d'armes* and photographic studio.

The grand staircase ascends only to the first story, upon which floor, of course, are the main reception-rooms and halls. The staircase itself is an admirable one, in white marble with bronze hand-rail, and recalls not a little the fine one at the Château de Chantilly, in so far as concerns beauty of workmanship. At the level of the second story the vault is pierced with a circular opening with gallery all around it, and through it one sees the glazed roof above and the decorations of the gallery itself, which being, in general tone, of a light, clear green, offer a charming contrast to the richness of the gilded and brilliant staircase itself. A portico with marble columns and gilded bronze capitals surrounds two sides of the staircase-cage at the level of the first floor. The landing gives access to a great waiting-room of octagonal shape, through which one passes into a gallery which has the same length as the grand *salon d'honneur*, which opens into it by three great doors. The *salon* fills the whole breadth of the house between the two wings, its five windows opening onto the balcony over the peristyle. At the right of the *salon* are two smaller rooms intercommunicating, while on the left is the great dining-room.

Through the octagonal waiting-room one has access to the library, which is the marvel of the palace. In other parts of the building there is on all sides evidence of good taste in the decoration, its richness being derived from the superior quality of the materials: the chimney-pieces are of the finest marble, the woodwork is carved with skill, and the bronze-work is admirably executed. The whole is in excellent taste and artistic, yet its chief quality, perhaps, is that it recalls servilely no one style. Reminiscences of Louis XV work are corrected and strengthened with great skill by more modern forms, which modify their character without destroying their elegance. Yet with all this, one does not in this part of the building feel the impress of the owner's personality. It is only on passing into the library that one feels that this is the home of a true lover of books, that here it is that he lives, that here his aims centre. This library, large enough to contain 1,800,000 books, consists of four great galleries, ranged about the court above the stables. The

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galleries are shelved full height, the upper shelves being reached from a gallery on corbels, to which ascend circular stairs; furthermore, rolling ladders of the latest pattern are abundant on all sides. The rear gallery on the Rue Fresnel is devoted to the Prince's own work-rooms. It is lighted through great windows above entrance to the stables and the servants' quarters, and the view from them overlooks all Paris and the heights of Châtillon and Meudon. One cannot too greatly admire the *ordonnance* of this library, finished in finely-carved wood; the brackets that support the galleries and the railings of the circular stairs have also a rare distinction. In short, it is a palace for books.

The Prince's room is still more richly finished and is ornamented with a fine chimneypiece of sculptured wood, over which hangs a portrait of the Prince.

In order to protect, so far as possible, all this part of the building from fire, an isolating gallery has been built around the lower court-yard buildings and under the storerooms of the library itself. This gallery is far from being the least of the curiosities of the lower court-yard, to which it adds a very decorative aspect. The library itself is lighted from above, except in the case of the entrance gallery which is the only portion of it that has rooms above it.

The façade on the Avenue d'Jéna is treated in an interesting manner; it counts two full stories only between the level of the first floor and the main cornice. The curtain-wall between the wings, pierced with five bays, is very sober of aspect in line and projection. The two wings, on the other hand, with one window to each story have this feature treated with great richness. The great full-centered window of the first story is ornamented with lion-headed gaines which support the *trompe* of the semicircular balcony of the story above. The corresponding windows of the second story are decorated with caryatides on either side, which support, in slight projection from the main cornice, the broken pediment with its included dormer above. A stone balustrade, interrupted over the curtain-wall by oval dormers, crowns the façade.

The façade on the Rue Fresnel, much more modest in character, is, nevertheless, very interesting. An enormous arch, sprung between two pylons the width of the court-yard apart, gives entrance to the stable court-yard and affords it light and air; above this archway rises the two stories of the rear gallery of the library, in which are the Prince's work-rooms. The general effect of this façade suggests not remotely the aspect of a town gateway, for to right and left of the enclosing pylons stretch the great terrace walls of the neighboring gardens.

Taken all together, this palace is one of the most interesting of the structures recently built. It shows what an architect can do when he is fortunate enough to have as his client a man rich, intelligent and artistic, who allows him to satisfy, as completely as possible, the double aim of our art — the utilitarian and the artistic.

The members of the Congress also visited the Sorbonne, which will be wholly finished only in time for the Exposition of 1900. I need not speak of the grand lines of this noble monument which I formerly described in No. 754, *American Architect;* I only wish to refer to-day to the harmony of the interior decorations. In this case the architect, M. Nénot, was the master of his decorative artists, and consequently the decorative paintings do not offer those unhappy contrasts that confront one at the Hôtel de Ville. At the Sorbonne all is tied together and the several parts support one another. Nevertheless, the effect is not monotonous and the different rooms present decorations of very various character, but in each room there is a unity and harmony of decorative treatment. The one slightly discordant effect is due to M. Besnard, who in the chemical amphitheatre has indulged in a very orgy of incoherent symbolism which it would be sheer cruelty to describe. When confronted with the expressions of astonishment voiced by the members of the Congress on beholding this piece of brutal coloring, M. Nénot attempted to make an explanation, but failed in his effort.

Amongst other interesting visits of inspection made during the Congress was one to the *Post and Telegraph* Building, designed by M. Scellier, of Gisors, and another to the new scene-dock of the Grand Opera-house. An excursion made to Rheims allowed an inspection of the treasures of that city.

The proceedings finished with the distribution of honors awarded by the Société Centrale. For the second time was awarded the grand Gold Medal of Honor, founded in 1891 by M. Guerinot, and to be granted to that French architect designated by his distinguished and honorable career. This year the honor fell to M. Héret one of the most esteemed deans of the profession.

Silver medals were awarded to MM. Emile Ulmann, Ernest Janty and Joseph Galinier, the latter a Toulouse architect and the designer of a fine building for the *Depêche*, one of the most influential newspapers of the South of France.

The archæological medal was bestowed on M. Albert Ballu for his interesting investigations conducted at Tebessa in Algeria. And, finally, minor medals were granted to the pupils of different schools, as well as to certain contractors and deserving workmen, in recognition of the faithful performance of their duties. In many cases the recipient betrayed not a little emotion in stepping forward to receive this public recognition of years of honorable effort.

The competition for the selection of designs for the two palaces that are to be built on either side of the new Avenue des Champs Elysées for the Exposition of 1900 has just been decided.

Fifty-nine architects undertook this enormous task, although only two months' time was allowed for the work, and of course it was impossible in so short a time to properly study a problem of such magnitude. Consequently the result has not been wholly satisfactory and though amongst the several designs there could be discerned individualities of considerable merit and details very artistically composed, the jury did not find before it any work the ensemble of which was so satisfactory as to warrant them in accepting it for execution. The administration is all the more embarrassed, because time is so scanty and final studies should be begun as speedily as possible.

It is probable that these studies will be carried on under the direction of M. Bouvard, Directeur des Services d'Architecture, who will derive from the several premiated designs the element for the new palaces that must be built. But who will have charge of the actual construction? As it is here not a question of temporary exhibition buildings, but of structures that are to remain as part of the artistic wealth of the city, this question is a serious one.

To-day I will give only the names of the architects who won prizes.

For the larger palace the prizes were:

1st Prize,	15,000 francs.	M. Louvet.
2d "	12,000 "	MM. Deglane & Binet.
3d "	8,000 "	M. Thomas.
4th "	6,000 "	M. Girault.
5th "	4,000 "	M. Tropey-Bailly.

For the smaller palace, which is to face the larger one on the other side of the new avenue, the prizes were:

1st Prize,	5,000 francs.	M. Girault.
2d "	4,000 "	MM. Cassien, Bernard & Cousin.
3d "	3,000 "	MM. Toudoire & Pradelle.
4th "	2,000 "	M. Mewes.
5th "	1,000 "	MM. Deperthes et fils.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

AMERICAN SURETY BUILDING, BROADWAY, NEW YORK, N. Y. MR. BRUCE PRICE, ARCHITECT.

[Gelatine Print, issued with the International and Imperial Editions only.]

STAIRCASE TOWER, SCHLOSS HARTENFELS, TORGAU.

SEE article "German Castles," elsewhere in this issue.

PLANS, ELEVATION, SECTION AND DETAILS OF THE HÔTEL OF PRINCE ROLAND BONAPARTE, PARIS, FRANCE.

FOR description see the letter of our Paris correspondent, elsewhere in this issue.

[The following named illustrations may be found by reference to our advertising pages.]

SGRAFFITO DECORATION, NO. 1 VICOLO SUGARELLI, ROME.

A RESTORATION OF THE CHORAGIC MONUMENT OF LYSICRATES, ACCORDING TO STUART AND REVETT. PROBLEM IN PERSPECTIVE, DEPARTMENT OF ARCHITECTURE, DREXEL INSTITUTE.

A GROUP OF URBAN CHURCHES.

[Additional Illustrations in the International Edition.]

CENTRAL DORMER OF THE HÔTEL DE VILLE, LA ROCHELLE, FRANCE.

[Copper-plate Etching.]

ENTRANCE PORCH TO THE AMERICAN SURETY BUILDING, BROADWAY, NEW YORK, N. Y. MR. BRUCE PRICE, ARCHITECT, AND MR. J. MASSEY RHIND, SCULPTOR, NEW YORK, N. Y.

[Gelatine Print.]

CASTLE GROVE, HEADINGLEY, YORKS, ENG.: THE SALON. MR. T. BUTLER WILSON, ARCHITECT.

THIS mansion has been recently rebuilt upon the site of a former building, and the stabling has been remodelled and refitted. The illustrations here published give two views of the Salon and the accompanying detail of the gallery arcade. This Salon, with the remaining apartments grouped round and opening from it, is the principal and most spacious apartment of the house, and forms

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the common room of the household, fulfilling the several functions of lounge, writing and reading room, music and ball room. The apartment rises to a height of 28 feet. Its columns are of marble, with their capitals and bases in ormolu. The floor is of oak parquetry, inlaid with broad lines of walnut, while richly-figured Italian walnut is used for the whole remaining woodwork, the Atlantes to the mantel being gilded. The walls are hung with tapestry. Fibrous plaster forms the ceiling and upper entablature, from which are suspended ormolu lanterns.

DETAIL OF ARCADING IN SAME ROOM.

GRAND STAIRCASE, HÔTEL DE VILLE, PARIS, FRANCE.

The grand staircase is not comprised in the parts of the Hôtel de Ville which are open to the inspection of ordinary visitors. Apart from its constructional excellence it has accessories which are interesting. The bronze-equestrian figure of "A Herald" is by M. Frémiet. There is also a memorial of the late M. Ballu, the architect, and some other statues and reliefs.

NOTES AND CLIPPINGS

Pumping Hot Water. — How high will a pump lift water, and how high can hot water be lifted by a pump? are questions which continue to be animatedly discussed by engineers, and some statements on this subject have been made which, to say the least, are quite remarkable. Theoretically considered, cold water may be lifted by so-called suction 33.9 feet above the surface of the supply, but owing to the defects of machinery we find that in practice, under highly-favored conditions, water can be lifted in this manner to a height of only about 27 feet. Special apparatus, says an American paper, might do better than this, but ordinary devices never do. All pumps are constructed with valves, and those valves have a certain weight which must be deducted from the pressure of air by which the water is forced above its level; for the action of a pump, primarily, there is nothing more than exhausting the air from above the water. A portion of the loss of duty in a pump is due to leakage, even when in the best practical working condition, so that ordinary leakage and weight of valves limits the lifting power of an ordinary pump to 27 feet of water, or a column equalling 11.7 pounds in weight per square inch of cross-section. The next question that arises is at what temperature will a pump lift water to this height? Practical experiment has repeatedly shown that when the water has a temperature of more than 50° Fahr. it cannot be lifted to the same height by the same pump, and the reasons for this are that there is an unbalanced air-pressure of 3 pounds remaining in the pump, and that the vapor given off from the water at that temperature is sufficient to fill a portion of the space and prevent the water rising to that height. When water, under an atmospheric pressure of 3 pounds is transformed into vapor, the volume of vapor produced is so many times greater than that of the water that only a small volume of water is sufficient to produce vapor which will fill an exceedingly large space and be sufficient to prevent the full action of the pump. Under these conditions the vaporization of a very small portion of the water would be sufficient to fill the suction pipe and cylinder of the pump, but this would not be necessary to prevent it working, as if only the 100th part of the water is vaporized — and there is sufficient heat present to provide for the vaporization of much more than this amount — the vapor produced will prevent the water being raised to the height of the pump, if it is about 27 feet above the surface of the water. As the temperature of the water is increased above this, the height to which it can be raised will decrease in a corresponding ratio. Of course, when we speak of lifting water to any such height as this, it is necessary that suction pipes, valves and pump-plunger shall be absolutely air-tight, a condition which it is quite difficult to obtain in practice without introducing other difficulties of greater moment, as, for instance, excessive friction in the pump cylinder, which will require a greater amount of work to overcome than that which is utilized in raising the water. That water gives off vapor copiously, when relieved of the air-pressure upon its surface, is shown by laboratory experiments where a shallow dish of water placed under the bell glass of an air-pump and the air-pressure reduced; vapor is given off so rapidly that, by its absorption of heat, owing to its change of condition, the temperature is reduced to such an extent that the water is rapidly frozen and becomes solid ice. Water, when at a temperature of 98° will boil in a perfect vacuum, the heat contained in the mass being given up and transforming a part of the water into steam. A vacuum sufficiently perfect to produce this effect on water of 98° temperature is not easily obtained, owing to the imperfection of the apparatus; but, with reasonably good pumps, or other means of reducing the air-pressure, water at a temperature of 100° can easily be made to boil by such a reduction of the air-pressure as can readily be obtained. In attempting to lift hot water, or water of a temperature above 100°, the height to which it can be lifted cannot be readily calculated on account of the invisible vapor given off from the surface and filling a portion of the space before boiling commences. When water at 100° is changed into steam at 100° the volume is increased nearly 3,000 times, so it will be readily understood that if the pressure of air is relieved to such an extent as will permit the water to boil, the vapor resulting from such action would fill the suction pipe and cylinder of the pump, and its further action would be expended on the elastic force of the steam, so that the water could not be lifted above a certain height; but that water of a much higher temperature can be lifted certain distances will be readily understood by considering that, if the pressure of air within the pipe be relieved to a certain extent, the superincumbent pressure of the atmosphere on the water which forms the supply will force it upward in the pipes to a height due to the difference in pressure, excepting that, at all temperatures, water gives off a vapor when the pressure on its surface is reduced. To illustrate, suppose we take water at a temperature of 143°, which will boil under a pressure of 3 pounds absolute; then if we reduce the pressure on its surface to nearly this amount, we will have an unbalanced pressure of about 11.5 pounds to force it upward in the pipes, which it would do to a height of about 26 feet were it not for the vapor given off, which fills the space and makes it impossible to retain the reduced temperature with water at that temperature. The best pumps have a lifting efficiency of only about 80 per cent under favorable conditions of operation, and this includes that the water be of the lowest practical temperature, so that instead of an unbalanced pressure of 11.5 pounds being sufficient to force the water to a height of 26 feet, practice demonstrates that 12 feet is the greatest height to which water at 140° can be lifted by a so-called suction pump, and as the temperature of the water is increased, the height to which it may be lifted decreases in a much greater ratio. All accounts of lifting water having a temperature of 200° and upwards, by suction pumps, must be taken with a great deal of allowance for incorrect observation and mistaken data. — *Invention.*

The Tombstones at Scutari. — At Scutari the *coup d'œil* is picturesque in the extreme. As far as one can see, the long, slender shafts of marble rise beneath the shadow of the massive cypresses — the tree of Allah, the Osmanli call it, which points its finger to the sky — while the luxuriant vegetation of the East clusters around the base of the slabs, emphasizing their snowy whiteness and preventing them from being too dazzling to the eye. Each tomb bears its own decoration. A single leaflet, the drooping petals of a rose, or graceful frond of fern indicate that a female form lies below. A turban or a fez shows that the dead person was a man. Lamps, ostrich eggs, sashes, fringed and colored handkerchiefs of varied hue, all have their own signification; while here and there will be some tall stone sculptured from end to end, its ornamentation in high relief, encircled by a number of smaller stones, which proves that the father of a family — a man of wealth — rests here, surrounded by his wives and children. A curved scimitar shows that a man of war reposes there, an anchor marks the sleeping place of a sailor, a wand of office proves that the dead man held some post of command. So on, till something is learned of all, even though one may not be able to decipher the fantastic Arabic characters which tell with more detail the history of the dead. — *The Churchman.*

Heraldic Decoration. — Without some knowledge of the science of heraldry it is impossible to appreciate the various devices which appear in the ornamentation of many of our public buildings and churches. Within the last few years in particular, Americans have given closer attention to the dignity and beauty of these stately edifices, and it requires but a passing glance to acquaint us with the part that heraldry plays in their embellishment. The revived taste for the well-defined styles of architecture of the mediæval period is apparent in all our larger cities: the introduction of the griffin, lion and other heraldic figures is particularly noticeable. Take, for instance, the Public Library of Boston, "built by the people and dedicated to the advancement of learning," in which heraldic decoration forms one of the most important features. The heraldic seals of the State, city and trustees are beautifully carved on panels above the main entrance; the seals or book-marks of the world's most famous publishers, beautifully carved, are a feature of the exterior decoration, and eagles, lions, the signs of the zodiac, and other symbols, are executed in various parts of the building with telling effect. The quaintly carved "lion and unicorn" upon the old Boston State-House speaks plainly of British occupancy, and the many coats-of-arms on old tombstones in that city and vicinity cannot fail to impress the observer. An especially rich display of sculptured coats-of-arms is to be seen upon the Gettysburg battle-field, where costly monuments bear the arms of the States by which they have been erected in commemoration of the troops who participated in that memorable conflict. — *Eugene Zieber, in August Lippincott's.*

Stowe House. — Stowe House, long the home of the ducal house of Buckingham, has been placed in the hands of agents to be let or sold. Many readers will remember the place from Pope's often-quoted line — "A work to wonder at — perhaps a Stowe." Others will recollect references to its glories in the writings of Horace Walpole, Congreve and others, who have termed it an "Elysium." "If anything under paradise," wrote Pope to Bollingbroke, "could set me beyond all earthly cogitations, Stowe might do it." Lord Chesterfield and Lord Chatham were as loud in its praises as Walpole. In the present century Stowe has more than once been the temporary home of the exiled royal family of France; and it is now offered "to be let or sold, owing to the death of the Comte de Paris." Stowe belonged to the Canons of Oseney, near Oxford, till the Reformation, when the broad acres of the estate were given, for a short time, to Wolsey's great college at Oxford. Four centuries ago, in 1592, it was conveyed to the Temples, one of whom soon afterward erected there a mansion, which was enlarged by Lord Cobham, through whom it passed to the Grenvilles, and so to the Dukes of Buckingham. The estate having become involved in debt, the place was dismantled in 1848, when the furniture alone was sold by George Robins for upward of £70,000. The last Duke lived again at Stowe, but after his death the property passed into female hands. Some idea of the size and grandeur of Stowe may be formed from the fact that its grand front is 900 feet in length. Its gardens, roseries and collections of foreign trees and shrubs are among the finest in the kingdom, and so also are its statuary and sculpture, both inside the house and in the adjacent grounds; and the Grecian and Italian temples which diversify its "Elysian Fields" are full of classical inscriptions, chiefly from the pens of scholars and statesmen of the last century. The gardens were originally laid out by Bridgeman, but were largely altered and improved by Kent and by "Capability" Brown. — *The London Times.*

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Staircase Detail: the Guaranty Building, Buffalo, N. Y. — A Group of Country Houses. — Fireproofing Tests of Unprotected Columns. — Apparatus used in Conducting the above Tests. — Sketches by Mr. W. T. Partridge.

Sgraffito Decoration, 103 Via Tomacelli, Rome. — Accessories of Landscape Architecture, No. XXVI: Stairway Approach to the Villa d'Este, Tivoli, Italy. — XV Century Sgraffito in Court-yard of the Collegio Penitenzieri, Piazza Scossa Cavalli, Rome, Italy.

Additional: Lower Stories of the Guaranty Building, Buffalo, N. Y. — Corridor in the Same Building — Bits of "Old Berlin" at the Berlin International Exhibition. — Main Building and Main Restaurant and Water-tower, Berlin International Exhibition. — Saloon of the Royal Mail Steamer "Gothic," of the White Star Line. 63

NOTES AND CLIPPINGS. 64

DEATH has been busy among the artists of late, both in this country and abroad. Among Americans, the loss which will be most deeply felt is that of Olin L. Warner, the sculptor, who was not only one of the truest artists that America has ever known, but was ever foremost in the efforts, which have done so much for this country, to unite and encourage artists. Mr. Warner was apparently in the very prime of his useful life. He was fifty-two years old, having been born in Suffield, Connecticut, in 1844. As a boy, he showed remarkable artistic talent. His father, who was a clergyman, gave him a good general education, but he devoted his holidays to modelling in clay, under such instruction as he could get, and, at the age of twenty-two, went to Paris and entered the School of Fine-Arts as a pupil of François Jouffray. After three years in Paris, he returned to this country and began the earnest practice of his profession. It is hardly necessary to say that a sculptor in this country must struggle long and hard for reputation and employment, but Warner's careful work, and the unrivalled delicacy of feeling of some of his small portraits, steadily brought him into favor. Among his more important statues are those of William Lloyd Garrison, in Boston, and of Governor Buckingham in the Connecticut Capitol, at Hartford; and Portland, Oregon, possesses a fountain, adorned with a figure of a nymph from his hands. Mr. Warner's death was the result of an accident. He was riding a bicycle in the street in New York about two weeks ago, when he came into collision with a carriage, and suffered a fracture of the skull. He was taken to a hospital, but the injury proved too serious for surgical skill, and he died there, after an unsuccessful operation for his relief. He had been for nearly twenty years a member of the Society of American Artists and was also an Associate of the National Academy of Design and a member of the Century Club.

ON the other side of the Atlantic, the death of Sir John Everett Millais is, to our mind, the severest loss that English art has sustained for a generation. Curiously enough, while Lord Leighton, whose ancestry was purely English, was rather a Continental than an English painter, and found, perhaps, his most appreciative critics in France, Millais, who belonged to an ancient family of the island of Jersey, and therefore, presumably, was of almost unmixed French descent, was the most English of all artists, more English, even, than Sir Joshua Reynolds himself; for, while a Continental critic is occasionally found who can appreciate the physical charm of Reynolds's Anglo-Saxon beauties, the spiritual attractions of Millais's subjects, the continence and conscientiousness which he made them express so plainly, were totally lost on the public beyond the sea, which could discover nothing but rigidity in the noble figures which appealed so strongly to the best sympathies of the English. What the explanation may have been of this intense insularity of Millais, we will not attempt to guess, but it is a satisfaction, in these days of Grosvenor Gallery horrors, to reflect that Millais, and, in a humbler way, John Leech, have preserved in their works enough of the spirit of the good and happy England of the nineteenth century to give pleasure and comfort to future generations of Englishmen, long after the corporeal contortions of the æsthetic school of painters have been forgotten.

IT is hardly necessary to speak of Millais's works, for, whatever politicians may say, nothing which affects English feeling fails to find sympathy in America, and Millais's book and magazine illustrations, which really brought him wider fame than his pictures, are probably as widely known here as in England; while, twenty-five or thirty years ago, there was hardly a house in America, which could boast any pictures at all, which did not have a print or photograph of the "Huguenot Lovers" hung up somewhere. Every one, however, may not know the interesting circumstances of his life. Although his family belonged to the Channel Islands, he was born in England — at Southampton. While a mere child, he was placed in Mr. Sass's Academy, then considered the best private school of drawing in London, and at the age of nine gained the medal of the Society of Arts for his work. At eleven, he was a student at the Royal Academy, winning all the principal prizes for drawing; and at seventeen he had a picture in the Academy Exhibition. After this, he exhibited nearly every year until 1894. Like so many others of the more conscientious young painters of the day, Millais, like Leighton, interested himself in the Pre-Raphaelite movement of 1850 and the succeeding years. Millais followed the movement more faithfully than Leighton did, but, in the end, nature prevailed over formulas. Nothing could be more curious, as showing the divergence, in the development of an artistic principle, between a man of real capacity like Millais, and a doctrinaire like Rossetti, than the contrast between the "Huguenot Lovers," or, perhaps, the still more beautiful "Ophelia," both of which belong, in date, to the period of Millais's Pre-Raphaelite experience, and the "Dante and Beatrice," which is popularly supposed to represent the culmination of Rossetti's art. From the "Huguenots," or "Ophelia," it was an easy step for a true artist to the study of things with his own eyes, undimmed by either Pre-Raphaelite or Classical spectacles; and Millais's eyes were clear enough to need no assistance from theories. He soon became renowned in portraiture, a branch of art which derives little assistance from subjective speculation, and it is probably for his portraits that he will be longest remembered, although he often exhibited ideal compositions. It is hardly necessary to say that he was loaded with every honor that the artistic world of England could bestow, and was chosen last winter President of the Royal Academy, to succeed Lord Leighton. Although his work was little known in France, and probably still less appreciated, the French, with their usual tolerant respect for the notions of other people, bestowed upon the famous English painter the cross of the Legion of Honor, and made him a foreign Associate of their Academy of Fine Arts.

A FEW weeks before the death of Millais there passed away still another artist, whose name is familiar to all who have a knowledge of English art, one who, had he lived at a somewhat later day, would have been likely to be sought out by architects who found their clients willing to entrust the decoration of their public buildings to a capable historical painter. Edward Armitage, who was born in 1817, received his training in Paris under Paul Delaroche, whom he assisted at the time of the painting of the latter's famous allegorical decoration on the walls of the Hémicycle at the École des Beaux Arts. With such a training under such a master it would have been only natural that Armitage should have devoted himself mainly to mural decoration, but, so far as we know, his only work in this line consists of two frescos — so-called — in the Houses of Parliament, London, one of which in the upper waiting-room or Poets' Hall, exhibits his rendering of the "Death of Marmion," which typifies Sir Walter

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Scott's standing as a poet. Armitage was elected a full Academician in 1872 and for several years occupied the position of lecturer on painting before the students of the Royal Academy School, and because of his interest in this portion of his life work established the Armitage Prize, which is awarded to the winner in a competition for the best sketch for an historical painting.

AMONG the architects, we have to record the death of several men of note. Of these the best known was probably Mr. Patrick C. Keely, who is said to have designed and built more than six hundred Roman Catholic churches in this country, and to have had plans for fifty of them in preparation in his office at once. Mr. Keely was born in Kilkenny, Ireland, in 1816. His father was an architect, and the son studied and practised with him until he was twenty-five years old, when he came to this country, settling in Brooklyn. He soon found employment, and was thenceforth probably the busiest architect in the United States. He is said to have built every Roman Catholic Cathedral in New York State, except the one in New York City, and he designed many more in New England and Canada, besides a few Protestant churches. Of course, with such an enormous press of work, no architect could devote much time to studying refinement of design, but his work was always skilful and clever, and often very interesting. His best work is probably the Jesuit Church, on Sixteenth Street, New York.

Another architect of much talent, in a different way, who has just died, was Mr. J. Foster Ober, of Boston. Mr. Ober practised for many years successfully in and about Boston, but, his health being delicate, he was obliged to spend much of his time abroad in search of favorable climate, and his keen observation and lively descriptions of his experiences gave him for a time a high reputation as a writer.

Still a third architect whose death should not pass unnoticed is Mr. George H. Millar, Assistant Architect of the Capitol at Washington. Mr. Millar had been attached to the building for forty-four years, only leaving it temporarily, in 1861, to enlist in its defence. He was actively engaged in supervising the erection of Walter's great dome, and was the last man to leave the scaffolding after its completion.

Rufus G. Russell, another architect, one who has been content to pass a useful but quiet life in one of the smaller New England cities, also died August 3d, at the age of seventy-three, having passed thirty years of his life in the practice of his profession in that quiet collegiate town, New Haven. Besides the many houses, churches and other buildings which Mr. Russell designed for New Haven, he also designed and built the Garfield Memorial Church, at Washington, D. C.

A STORY is going about the newspapers, to the effect that "a Boston archæologist" has discovered "in the wild region of the Sierra Madre Mountains," in Mexico, the remains of a "prehistoric city that must have once had a population of two hundred thousand." How the "Boston archæologist" ascertained with such precision the population of his "prehistoric city" we are not informed, but his scientific insight in this respect is much less surprising than the idea of the existence, in "prehistoric" times or any other, of a city of such importance in the midst of a region of high mountains. It is true that Mexico occupies an elevated situation, but it is surrounded by a vast and fertile table-land, which gives it something of the nourishment which all large towns need, and without which no town has ever grown to the size attributed to this mysterious settlement of the Sierra Madre. The newspapers give us the further information that "nearly all the buildings" in this ancient city "are of brownstone, and are in a state of almost perfect preservation, and they contain ornaments and utensils of peculiar designs." As Athens in the time of Pericles had a population probably not very far from two hundred thousand, and, notwithstanding the fact that its houses at that age were built of mud, and that its few stone buildings have endured a score of sieges, plunderings and conflagrations, still offers almost inexhaustible treasures to the archæologist, it may well be assumed that a city of similar size, "nearly all the buildings" which are of stone, and which has been preserved almost intact from a "prehistoric" age, ought to interest a good many people besides archæologists; but we imagine that the world in general will be disposed to wait for confirmation of the story.

ACCORDING to the New York papers the English portion of the owners of the Hudson River Tunnel are anxious to recommence the work, which was suspended four years ago, and push it to completion. About three-fourths of one tunnel is already done, if we recollect rightly, and the second tunnel is begun, so that it will not be a very expensive matter to finish the work, and it is obviously very desirable for the owners to get the tunnel into use before the completion of the Hudson River bridge, the plans for which have, we believe, already been accepted. Of course, it will be impossible to raise any money in this country for the tunnel, or for any other important public undertaking, in the present politico-financial uncertainty, but a settlement of the currency question would probably be soon followed by the resumption of operations on this great work.

THE Court Theatre at Munich is said to have been furnished by an inventor named Lautenschläger with a revolving stage, arranged in such a way that two or more scenes can be set upon it, and turned in succession toward the auditorium. Munich is famous for its eccentricities in the way of building, but this sort of stage is, we imagine, not likely to be imitated, at least on a large scale. To say nothing of the difficulty of increasing the dimensions requisite for a theatre of the first class the circular stage which, at Munich, is only about fifty feet in diameter, and would hardly admit a proscenium-opening of more than thirty feet, the difficulties arising from lack of depth, and complicated arrangement of overhead machinery, would be enormous. Few modern theatres of the first rank have a stage less than ninety or a hundred feet deep, and a scene bounded by converging sides ten or twelve feet deep, and a flat only twenty-five feet back from the footlights, would be utterly inadequate to the needs of any modern city theatre in this country, or in England or France.

ARCHITECTS should lay to heart the account of a fatal accident which took place a few days ago in New York. Every one knows that in New York the only entrance to the kitchen is under the front steps, so that a row of ash-barrels, like an avenue of sphinxes, commonly adorns the approach to even the most aristocratic mansions. In order that the vertical distance between the front door above, and the servants' entrance below, may be sufficiently great, it is necessary to excavate a stairway to the latter, and, as this excavation adjoins the sidewalk, a railing is provided to keep the passers-by from falling in. The architect of a new house in Harlem, having in mind the æsthetic, rather than the physical needs of the public, designed for the house a fine area-railing in bronze, so disposed as to present openings more than two feet wide. After the railing was built, a little child, who happened to be playing on the sidewalk near by, crept through one of the openings, and fell on the stone stairway below, and was killed. A coroner's jury was called, which censured the Department of Buildings for having approved the design of the railing, but exonerated the owner, who could, indeed, hardly be considered at fault, and said nothing about the architect, upon whom a part of the blame certainly ought to fall.

WE mentioned not long ago a case where a firm of monument-builders, in New York, attempted to remove a monument from Greenwood Cemetery, under a statute giving to monument-builders a right or a lien on the structures erected by them, if the price is not paid. A temporary injunction was obtained by the owner of the monument, Mr. Brooks, to restrain the builders from carrying out their intention, and the Supreme Court of the State has just made the injunction perpetual, declaring that the statute is unconstitutional and void. According to the newspapers, the Court considered the unconstitutionality of the statute to consist in the fact that it provides for the taking of property without due process of law; but it does not appear clearly in what way it differs from the ordinary mechanics' lien laws in this respect. It is, however, plain that, as the Court said, the forcible removal of such a monument involves a desecration of the resting-place of the dead, and violence to the sentiments of natural affection which legislation has always protected and encouraged; and for this reason, if for no other, such summary proceedings are contrary to the spirit of our laws.

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FIRST REPORT ON FIREPROOFING TESTS.

ROOM 104, 22 WILLIAM ST.,
NEW YORK, N. Y., July 27, 1896.

BULLETIN NO. 2.

TO THE TARIFF ASSOCIATION OF NEW YORK; TO THE ARCHITECTURAL LEAGUE OF NEW YORK AND TO THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS: —

Gentlemen, — Your Joint Committee takes pleasure in submitting to you a report of work done to date. As you will remember, we, the undersigned, were appointed a joint committee to investigate and test methods of fireproofing structural metal in buildings and to obtain data for standard specifications.

Your Committee, after having effected its own organization, determined to add to its numbers by the creation of an Advisory Board. This step was taken for the purpose of more widely increasing the interest taken in the experiments, and also to prevent, as far as possible, the impression that the work was of a sectional or local character. The names of the gentlemen who accepted invitations to serve on this Advisory Board, are as follows:

Edward Atkinson, President Boston Manufacturers' Mutual Fire Insurance Co.; Osborne Howes, Secretary Boston Board of Fire Underwriters; Charles A. Hexamer, Secretary Philadelphia Fire Underwriters' Ass'n; H. H. Glidden, Manager Chicago Fire Underwriters' Ass'n; W. Martin Aiken, Supervising Architect United States Treasury Dep't, Representative Illinois Chapter, American Institute of Architects; Stevenson Constable, Superintendent of Buildings, New York; George B. Post, New York Chapter, American Institute of Architects; F. H. Kindl, Structural Engineer Carnegie Steel Co.; John R. Freeman, Chief Inspection Dep't, F. M. I. Cos.; Henry Morton, President Stevens Institute of Technology; C. J. H. Woodbury, Member American Society Civil Engineers; H. B. Dwight, Dwight Survey and Protection Bureau, New York; F. C. Moore, Delegate New York Board of Fire Underwriters to Board of Examination of Department of Buildings; Wm. A. Wahl, Secretary Franklin Institute, Philadelphia; John T. Williams.

The Committee also wishes to take this opportunity of publicly thanking the parties mentioned below, for their offers of assistance, namely:

The Continental Iron Works, for permission to use part of their yard and for numerous courtesies which have been extended to the Committee from time to time; the Carnegie Steel Company, Limited, for their offer to furnish all the structural steel that your Committee may need; Messrs. J. B. & J. M. Cornell, for their offer to furnish the cast-iron columns for which your Committee may ask; Messrs. Sinclair & Babson, for their donation of seventy-five barrels of Alsen's cement; the Lorillard Brick Works Company, through Mr. Henry M. Keasbey, for 54,000 common bricks; Mr. Henry A. Maurer, for his donation of 14,000 fire-bricks and fourteen barrels of fire-clay.

During the winter just past, your Committee erected a testing plant as shown in the accompanying Illustrations. The gas-producer in the background is 9 feet in diameter, by 12 feet in height, and is equipped with a hopper-valve on top. Gas is generated by means of steam from the boiler as shown, and carried into the furnace through pipes, as clearly indicated in the view (Fig. 0). The foundation shown on the left is ready for the erection upon it, of a furnace for testing beams and floors. Its dimensions are, length 27 feet, width 12 feet, but it can be arranged to take larger beams if so desired. The furnace shown on the right is for testing columns and is 14 feet square, outside measurement.

The arched roof is made of fire-brick and is independent of the side walls, being supported by outside corner posts. The walls are of common brick, but can easily be changed so that the experiments can be made on other materials. One side wall and the end wall with the door are 12½ inches in thickness; the rear wall is 8½ inches and the fourth wall is 4 inches inside, 2 inches air-space and 8½ inches outside, making a total thickness of 14½ inches.

The floor is covered with fire-brick, with openings left for the branch gas-pipes and air-spaces to support the combustion. These branch gas-pipes are 4 inches in diameter, capped with *tuyeres* reduced to 2 inches. In order to increase the temperature when desired, a barrel of naphtha is connected by means of a small pipe and blown into the gas-pipe at the "Y" branch, by means of a steam-jet.

The column is placed in compression by means of an hydraulic ram underneath, resting on three twenty-four-inch I-beams, the same as those across the top of the furnace shown in the view. In order to keep the entire length of the column within the furnace, filler blocks of cast-iron are placed between the ends of the column and these I-beams. The hydraulic ram is 12 inches in diameter, and the water-pressure can be carried to 2,500 pounds per square inch.

The temperature is measured by means of a Uehling & Steinbart pyrometer. As this pyrometer is in commercial use and has been thoroughly tested and described in various scientific journals, it is not necessary to enter here into a detailed description.

The money to carry out this work has been advanced by various parties, and, together with the Committee's disbursements, is shown in the accompanying treasurer's report.

TREASURER'S REPORT.

COMMITTEE ON FIRE-PROOFING TESTS, July 22, 1896:

SUBSCRIPTIONS RECEIVED.

Boston Board of Fire Underwriters	$ 400.00		
Boston Manufacturers' Mutual Fire Ins. Co.	200.00		
E. H. Kendall	25.00		
Carrère & Hastings	50.00		
R. Magnicke	50.00		
McKim, Mead & White	100.00		
Sooysmith & Co.	100.00		
R. H. Robertson	50.00		
George B. Post	100.00		
J. G. Howard	5.00		
The Tariff Association	500.00		
Bruce Price	100.00		
Lamb & Rich	25.00		
Clinton & Russell	100.00		
American Sugar Refining Co	100.00		
Philadelphia Fire Underwriters' Association	400.00		
Continental Insurance Co.	50.00	$2,355.00	
SUBSCRIPTIONS RECEIVABLE.			
The Tariff Association	500.00		
Boston Manufacturers' Mutual Fire Ins. Co.	200.00	700.00	
		$3,055.00	
Cash on hand		18.62	
Deficit		29.68	$3,103.30
EXPENDITURES.			
R. A. Bigelow, printing, etc.	$ 4.25		
Electro Light Engraving Co.	15.00		
Continental Iron Works, furnace, etc.	1,813.12		
W. H. Sturgis, sand	19.50		
John T. Woodruff, broken stone	68.00		
William C. Siegert, stationery	11.00		
Berton & Nichell, setting fire-brick lining	99.63		
Thomas F. Rowland Jr., for masons' wages paid	275.88		
Uehling, Steinbart & Co., two months' rent of pyrometer	30.00	$2,336.38	
LIABILITIES.			
The Continental Iron Works, labor, etc., on furnace and at tests		766.92	$3,103.30

Respectfully submitted,

G. L. HEINS, *Treasurer.*

Your Committee decided that it would be best to make the tests according to the following programme: —

1st. That a series of tests be made on steel and on cast-iron columns, without any fire protection whatever. These tests then to be taken as a basis of comparison with those that were to follow.

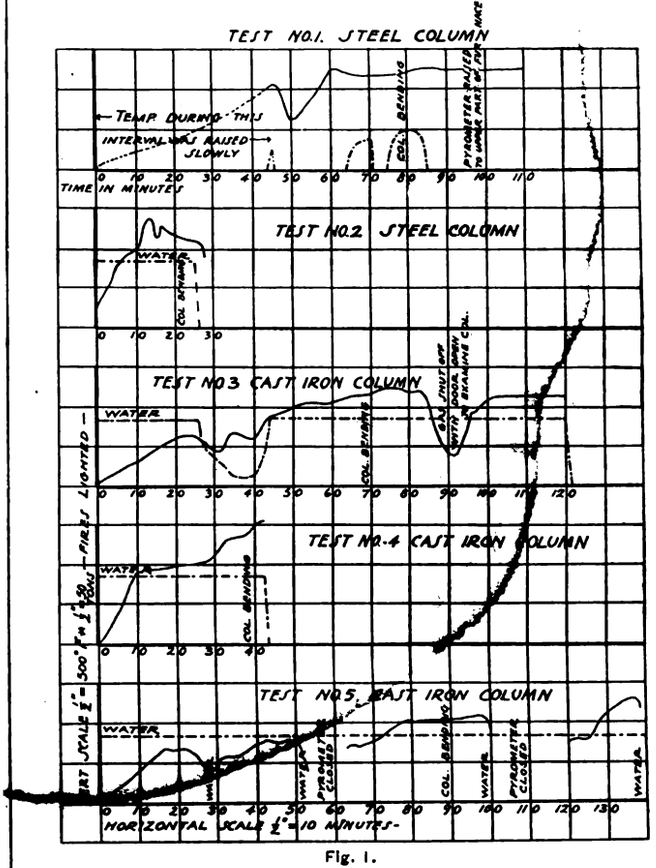


Fig. 1.

2d. That a series of tests be made with similar steel and cast-iron columns, protected with different materials and in different manner.

3d. That a series of tests be made on unprotected beams and girders.

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4th. That a series of tests be made on protected beams and girders.

It has also been proposed that each series be divided for test both with and without water.

Your Committee has communicated with many manufacturers of fireproofing materials and has been informed that these manufacturers will submit their materials for purposes of tests.

RESULTS.

The result of this series of tests is shown in the accompanying diagram (Fig. 1), where the solid line represents the temperature and the dotted line the road on the column.

Test No. 1 was made on a steel column, when the temperature was raised rapidly.

Test No. 3 was made on a cast-iron column under similar conditions. Both columns began to fail as soon as they showed "red."

Test No. 2 was made on a steel column, when the temperature was raised more slowly than in the other tests just described.

Test No. 4 was made on a cast-iron column under similar conditions. Both these columns failed when they began to show "red," although the time was longer than in Tests Nos. 1 and 3.

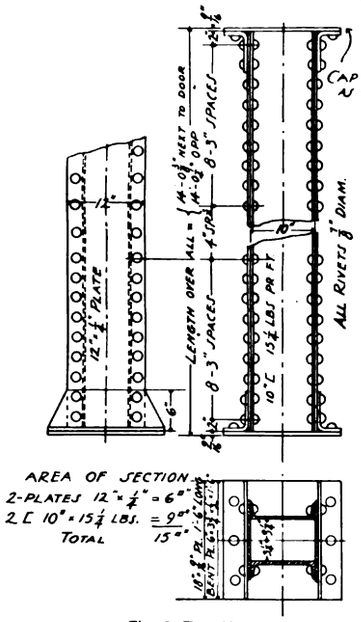


Fig. 2, Test No. 1.

Test No. 5 was made on a cast-iron column, a jet of water being thrown upon it through a ¾-inch nozzle. The column was first heated to 675° and then quenched with water without injury. The heat was then slowly raised again to 775° and the column again quenched with water. The heat was then raised slowly to a temperature of 1,075°, and the column, which showed a "dull redness," was again quenched with water. The heat was then raised again to 1,300° and the column, which now showed a "bright red," was again quenched with water. The column was beginning to yield by bending just before the last application of the water. The column was apparently unaffected by water, although it failed by bending under the load, the same as in cases 3 and 4.

COLUMN TEST NO. 1. — FIRE TEST WITHOUT WATER. — STEEL COLUMN.

MAY 19, 1896.

The walls of the furnace were of common brick, as described, and the door was closed with a double thickness of sheet-iron, which made the opening practically tight. The column was a Carnegie Steel Box-Channel, of the dimensions as shown in the diagram (Fig. 2), and was unprotected.

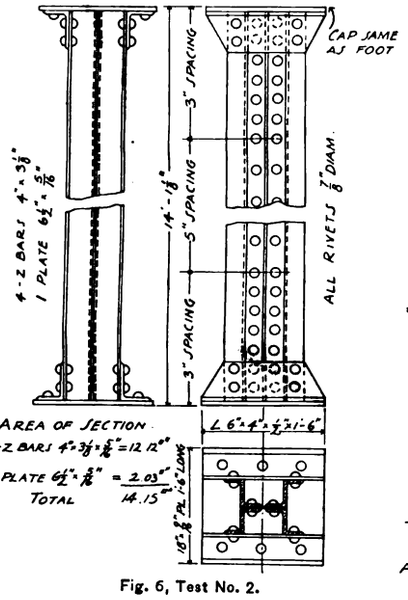


Fig. 6, Test No. 2.

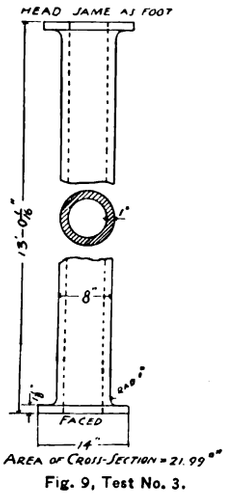


Fig. 9, Test No. 3.

The weather was clear and warm, with only a slight breeze from the west. Temperature of the air 80° Fahr., in the shade. The gas-producer was fired the day before, with valve closed against furnace. The packing in the hydraulic cylinder leaked and a fitting of the pipe gave out as test started. These causes delayed the use of the water-pressure.

Log of Trial.

Time, h. m.	Pyrometer, deg. Fah.	Hyd. Pressure, Total Load, Tons.	Remarks.
10.35	....	....	Wood fire lit.
10.45	....	....	Gas turned into furnace.
11.02	....	....	Furnace door closed.
11.03	....	....	Naphtha valve slightly open.
11.13	....	....	Pyrometer put in furnace through lower hole, 2 1-2 feet above the furnace floor, with point 12 inches from column.
11.19	1,025	....	
11.20	1,050	....	Pressure on column. Light load. Pyrometer point 24 inches from column.
11.25	600	....	Raking gas-producer; gas shut.
11.28	....	....	Gas turned on again.
11.33	1,025	....	No naphtha.
11.36	1,225	....	Half-faucet of naphtha.
11.38	1,200	....	
11.40	1,175	14.13	Water-pressure on.
11.41	1,180	28.26	Quarter-faucet of naphtha.
11.46	1,175	....	Pressure off, water-valve repacked.
11.50	1,175	....	Closed all air-openings. Water-pressure on.
11.55	1,200	48.06	Column began to show "red."
11.56	1,210	....	Column began to yield.
11.59	1,225	42.41	Hydraulic pressure falling fast.
12.10	1,230	....	Pyrometer shut off. Pyrometer raised to upper hole, 8 1-2 feet above floor, and point 3 feet from column.
12.16	1,230	....	
12.25	1,250	....	Gas shut off.

The column would have failed sooner if the working-load of 80 tons could have been used.

The result of the test is shown in the flashlight photograph (Fig. 3) taken of the column before it was disturbed. After the column was removed from the furnace the photograph (Fig. 4) was taken. The brick walls cracked, as is shown in photograph (Fig. 5), the greatest damage taking place where one wall was bonded into the next and the cracks at these places extended through the bricks. Along the horizontal joints the walls cracked most on the bond courses. All the walls were hot, the eight-inch wall being too hot to hold the hand in contact with it.

Strength by Gordon's Formula:
Breaking strength per square inch.. 45,630 pounds.
Area of cross-section..... 15 square inches.
Breaking load, 15 x 45,630..... 684,450 pounds, 342 tons.
Actual greatest load, cold, 141.4 tons, with no change of form.

COLUMN TEST. NO. 2. — FIRE TEST WITHOUT WATER. — FURNACE SAME AS TEST NO. 1. — STEEL COLUMN.

The column was a Carnegie Steel Z-bar, as shown in the diagram (Fig. 6), and was uncovered. The weather was clear and warm, with a moderate breeze from the northwest. Temperature of air, 80° in the shade.

Log of Trial.

Time, h. m.	Pyrometer, deg. Fah.	Hyd. Pressure, Total Load, Tons.	Remarks.
2.23	80	....	Pyrometer point, 3 feet from column.
2.24	200	84.8	Wood fire lit.
2.30	650	"	Gas turned on.
2.33	....	"	Door closed. Full cock of naphtha.
2.35	1,000	"	One-quarter cock of naphtha.
2.36	1,300	"	
2.37	1,350	"	
2.38	1,375	"	Naphtha closed.
2.39	1,300	"	
2.40	1,125	"	One-eighth cock of naphtha.
2.40½	1,300	"	
2.41	1,325	"	
2.42	1,250	"	
2.43	1,200	"	
2.44	1,175	"	Naphtha cock closed to "dropping."
2.45	....	....	Pyrometer moved to 2 feet from column as flame touched point.
2.46	1,125	"	Column began to yield.
2.47	1,125	"	Column yielding fast.
2.49	1,100	"	Impossible to maintain hydraulic pressure.
2.51	1,100		Pump and gas stopped.
2.52	900		Pyrometer closed.

The result of this test is shown in photographs (Figs. 7 and 8).

Strength by Gordon's Formula:
Breaking strength per square inch.... 42,820 pounds.
Area of cross-section..... 14.15 square inches.
Breaking load, 14.15 x 42,820..... 605,900 pounds, 303 tons.

COLUMN TEST NO. 3. — FIRE TEST WITHOUT WATER. — FURNACE SAME AS TESTS 1 AND 2. — CAST-IRON COLUMN.

JUNE 30, 1896.

The column was a cast-iron, hollow, round column, with flanges faced on both ends, as shown in a diagram (Fig. 9), and was un-

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covered. It was cast horizontally, with a dry sand core, by the Cornell Iron Works, New York.

The weather was clear and warm, with a slight breeze from southwest. Temperature of air, 75° Fahr.

LOG OF TRIAL.

Time, h. m.	Pyrometer, deg. Fah.	Hyd. Pressure, Total Load, Tons.	Remarks.
2.32		14.1	Wood fire lit.
2.45		84.8	Gas lit, door being closed.
2.50		"	Pyrometer in place, 18 inches from column.
2.51	575	"	
2.54	625	"	
2.57	625	"	Gas shut off to poke producer.
2.59	500	"	
3.00	475	56.5	Removed some loose bricks that interfered with *tuyeres*.
3.04	425	28.2	
3.05	450		Gas turned on, door closed.
3.06	650	15.5	
3.08	667		Air-openings closed.
3.12	600	11.3	Door down to arrange bricks.
3.13	650		Door closed.
3.13½	750		Naphtha valve opened one-half.
3.14	750		
3.15	812	42.4	
3.17	900	84.8	
3.21	950	"	
3.23	1,000	"	
3.25	1,025	"	
3.28	1,050	"	
3.30	1,025	"	
3.32	1,025	"	
3.36	1,100	"	
3.37	1,125	"	Slight redness reported by some.
3.40	1,137	"	Column reported bent slightly.
3.43	1,175	"	
3.44	1,200	"	
3.47	1,250	"	
3.50	1,225	"	
3.52	1,175	"	
3.55	1,200	"	Gas shut off. Door down. Column decidedly red and bent.
4.04	387	"	Gas on and door closed.
4.08	925	"	No naphtha.
4.09	925	"	Naphtha turned on one-half cock.
4.10	1,000	"	
4.15	1,112	"	
4.32	1,125	"	Gas shut off. Stopped pumping.

Strength by Gordon's Formula was as follows:

Breaking strength..... 902,000 pounds.
Safe load 1-5 x 902,000.. ..... 180,400 pounds, 90.2 tons.

The result of Test No. 3 is shown in photographs (Figs. 10 and 11).

COLUMN TEST NO. 4. — FIRE TEST WITHOUT WATER. — FURNACE SAME AS TESTS NO. 1, 2 AND 3. — CAST-IRON COLUMN.

JULY 6, 1896.

The column was a cast-iron, hollow, round column, with flanges faced on both ends, and was uncovered. It was cast horizontally with a dry sand core, by the Cornell Iron Works, New York. The column was the same as illustrated in diagram (Fig. 9), with the following exceptions: Length over-all, 13 feet 0¼ inch; thickness of flanges, 1⅝ inches; flanges reinforced by four ribs, each ⅞ inches thick, reaching from outer end of flange to cylinder at an angle of about 45°.

LOG OF TRIAL.

Time, h. m.	Pyrometer, deg. Fah.	Hyd. Pressure, Total Load, Tons.	Remarks.
2.22	....	....	Wood fire lighted.
2.25	....	84.8	Gas lighted.
2.28	....	"	Pyrometer placed 18" from column.
2.29	....	"	Door closed.
2.30	675	"	
2.31	875	"	
2.33	900	"	
2.35	912	"	
2.40	950	"	
2.43	975	"	
2.44	1,000	"	
2.45	1,000	"	
2.49	1,000	"	Naphtha used, one-fourth cock.
2.51	1,125	"	
2.52	1,100	"	More naphtha, three-eighths cock.
2.53	1,200	"	More gas.
2.54	1,300	96.1	
2.54	1,325	84.8	
2.57	1,350	"	Column bending.
2.59	1,350	"	More naphtha, one-half cock.
3.01	1,375	"	Color reported.
3.03	1,500	"	
3.03½	1,525	"	Column yielding fast.
3.05	1,550	"	Column broke suddenly.

The result of the test is shown in photographs (Figs. 12 and 13). The fracture occurred at about the centre of the column where the deflection was the greatest. There was a crack about five inches long, about seven inches above the fracture on the convex side of the column, showing that the column first pulled apart on the outside of the bend. No water was thrown on this column during the test.

COLUMN TEST NO. 5. — FIRE TEST WITH WATER. — FURNACE SAME AS TESTS NO. 1, 2, 3 AND 4. — CAST-IRON COLUMN.

JULY 10, 1896.

The column was a cast-iron, hollow, round column, with flanges faced on both ends, and was uncovered. It was cast horizontally with a dry sand core, by the Cornell Iron Works, New York. The column was the same as illustrated in photograph (Fig. 9) with the following exceptions: flanges were 1⅝ inches thick, and were reenforced with four ribs as in Test No. 4. There was a slight defect in this casting, there being a porous portion a few inches long on one side about 3 feet 6 inches from the lower end.

The weather was partly cloudy and sultry. There was a strong wind from the southwest. Temperature of the atmosphere was 80° Fahr.

Water was thrown upon the column through about 50 feet of 2½-inch rubber hose and a ¾-inch nozzle. The pressure at the hydrant was fifty pounds.

LOG OF TRIAL.

Time, h. m.	Pyrometer, deg. Fah.	Hyd. Pressure, Total Load, Tons.	Remarks.
2.16	....	84.8	Wood fire lighted.
2.28	....	"	Gas lighted.
2.29	600	"	Door closed. Pyrometer in place 18" from column.
2.31	625	"	
2.32	675	"	
2.33	700	"	
2.36	675	"	Pyrometer moved back 5 feet from column.
2.40	625	"	
2.41	675	"	
2.42	525	"	Water thrown on column one minute.
2.43	450	"	Door open. Fire out.
2.44	400	"	Door open. Fire relighted.
2.46	425	"	Door closed.
2.47	540	"	
2.49	1,000	"	Heat raising too fast.
2.51	656	"	
2.52	675	"	
2.55	700	"	
2.58	750	"	Pyrometer 3 feet from column.
2.59	800	"	
3.01	740	"	
3.02	750	"	Pyrometer 18" from column.
3.05	785	"	Pyrometer moved back 5 feet from column.
3.06	775	"	
3.09	400	"	Water on column one-half minute. Fire out. Door down.
3.16	....	....	Gas relighted. Door closed.
3.19	675	"	Pyrometer 18" from column.
3.22	700	"	More air admitted.
3.24	725	"	
3.27	775	"	
3.28	800	"	
3.30	900	"	
3.35	1,025	"	
3.40	1,025	"	
3.41	1,050	"	
3.50	1,050	"	Column red.
3.55	1,075	"	Water on column one-half minute. Fire out. Door down. More water on column as it was still red.
4.13	....	"	Gas relighted.
4.17	750	"	Pyrometer 18" from column.
4.21	787	"	Naphtha one-half cock.
4.23	900	"	
4.24	1,025	"	
4.27	1,150	"	
4.29	1,200	"	
4.30	1,250	"	Column getting red.
4.31	1,275	"	Column bending.
4.32	1,280	"	
4.34	1,300	"	Pyrometer moved back. Water on column one minute.
4.35	....	"	Door down and water on column again two minutes.

The result of this test is shown in photograph, (Fig. 14).

The column was very red when the water was thrown on it the last time. The brick walls and arch roof cracked when water fell on them. The column was badly bent, but otherwise appeared uninjured.

Respectfully submitted,

S. ALBERT REED,
For the Tariff Association of New York.
GEORGE L. HEINS,
For the Architectural League of New York.
H. deB. PARSONS,
THOMAS F. ROWLAND, JR.,
For the American Society of Mechanical Engineers.

The Committee on Fireproofing Tests.

ROMAN FEVER. — Roman fever is almost a thing of the past. From 650, in 1881, the deaths from malaria ran down to 254 in 1891, while for the last five years the average has been 149, the number in 1895 being 125. These figures are all the more significant in that the population of Rome has increased from 300,000 to 467,000 in fifteen years. — *Philadelphia Telegraph.*

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LONDON

THE NEW COUNTY-HALL QUESTION. — PROPOSED NEW GOVERNMENT OFFICES ON PARLIAMENT STREET. — INTESTINAL DISTURBANCES IN THE R. I. B. A. — TRINITY ALMSHOUSE.

TO many an onlooker it must appear that the London County Council finds the great joy of an action to lie in the conception and contemplation of it. The schemes evolved by the Council are always interesting, if only from their very magnificence, and it has always been pleasant to feel that the Council was content to expend large sums of money on public improvements while the need of a County-hall, an official establishment for themselves, grew year by year more acute. At last, however, there is a serious movement to obtain the accommodation required, and the London County Council has resolved to apply to Parliament for the necessary power to carry out their wishes. In mentioning, in the course of my last letter, the contemplated street improvement which was to consist in the formation of a new thoroughfare from the Strand to Holborn, I stated that it was uncertain whether the scheme suggested by the R. I. B. A. or the Council's own scheme would be finally adopted. At the Strand end of the new street, the R. I. B. A. had proposed the formation of a large triangular space of open ground, some four acres in extent, which it was hoped would eventually prove a satisfactory site for a County-hall. This was an ambitious and magnificent scheme, but appeared likely to involve a greater expense than that of the Council, who proposed to make the streets without appropriating the triangular space. The matter was laid aside for some short time, but interest was quickly revived when the question of a County-hall was discussed in connection with a site quite independent of the street improvement and in a different locality. This site is situated to the south side of Trafalgar Square. There is a small block of houses which stands between that square and that magnificently wide and wooded road, "The Mall." Starting from the bottom of Constitution Hill at Buckingham Palace, this road with a quadruple avenue runs perfectly straight for the length of St. James's Park, and curves to the right at last into the Horse Guards Parade. The first step in the provision of the new site for the County-hall will be the continuance of the Mall in a straight line from its interruption to Trafalgar Square. The Mall, thus continued, will then divide the new Admiralty Offices from a plot of land, some two acres in extent. It is this space which, it is hoped, may be obtained for the purposes of a County-hall. On the morning of the day on which the whole matter was to be discussed, a letter appeared in the columns of the *Times* from T. G. Fardell, Esq., London County Council, deprecating the fact that the question of a County-hall had been again raised while the financial position of the Council was anything but satisfactory. He quoted the late Lord Randolph Churchill: — "The only practical test of the urgency and necessity of public demand for any large expenditure is the willingness of the ratepayers to bear the increased burdens which such expenditure places upon them." He then went on to express a fear that the Council was drifting into a critical financial condition. He showed that since the creation of the London County Council, although the ratable value of London had increased by £4,250,000, the net liabilities were nearly £2,250,000 greater, while the County rate had risen 2½ *d.* in the pound. A second letter appeared on behalf of the Arts Committee of the R. I. B. A., signed by Alfred Waterhouse, R. A., L.L. D., Chairman, and Edw. Mountford, Esq., F. R. I. B. A., Hon. Sec., respectively, of the Committee. Without questioning from a financial point-of-view the wisdom of embarking immediately upon the scheme, the writers drew attention to the fact that *so far as was ascertainable from the estimates*, an extra expenditure of £653,370 would secure the four acres of ground comprised in the street-improvement scheme. They complained that a great opportunity was being lost in the division of the two enterprises, for, while it was proposed to spend £813,000 upon a site, small and unsuited to the purpose, an expenditure less by £150,000 would obtain a more central site twice as large, where a worthy building might stand to advantage and form a new architectural centre. This letter had no opportunity of influencing the vote, which, it was expected, would be taken that day, as the debate was adjourned. The next day appeared a letter from R. Melville Beachcroft, Esq., London County Council, who was able to cut away the figures which, under a saving clause, Messrs. Waterhouse and Mountford had appeared to include as a base to their argument. He showed that the cost of the bare land contained in this triangular space was not included in the estimate, but that another £1,500,000 would be required to purchase it. He went on to deprecate the combination of the questions of the Strand Improvement and the County-hall into an undertaking involving four millions. The result of such action, he said, would be that neither scheme would receive its due discussion and appreciation. The two plans taken separately could be treated as the requirements of each admitted. Messrs. Waterhouse and Mountford have since replied, wishing to show that the propositions of the Council and the R. I. B. A., being widely different in scale, render a simple comparative criticism of the matter impossible. They had no wish to appear to advise extravagance; they desired only "that the present proposals should form part of one comprehensive and coherent architectural scheme, which would be gradually worked out and which might ultimately prove less costly and certainly more efficient and worthier of London than the temporary expedients suggested." The reference to temporary expedients is explained by the fact that the Council, in view of the expense of the County-hall, intend at present only to incur an expenditure of half a million upon the Holborn to Strand improvement. This will consist merely of a clearance in the Strand as a preliminary step towards the construction of the thoroughfare at a further cost of £1,500,000. But with the County-hall scheme upon their own site in Trafalgar Square, the London County Council have decided to proceed at once, and are applying to Parliament for powers for the purpose. The site proposed for the County-hall has the merit of being very centrally placed in respect to its work, and is quite close to the existing offices of the London County Council, whose principal establishment once formed the offices of the Metropolitan Board of Works. Other affairs of the London County Council are at present scattered over the immediate district in various houses, a decentralization fraught with the highest public inconvenience. The cost of acquisition of land is estimated at £813,000; the building at £500,000, a total of £1,313,000. And though economy must be studied to a great extent in the building, it may be expected that a structure will be raised worthy of the site and its position as the central municipal offices of a great city.

A year hence, it seems probable, Parliament Street will be a centre of reconstruction. At the Trafalgar Square end the scheme I have just noted will probably be working itself out, while at the Houses of Parliament end there will be taking place the great alterations of which I gave you some intimation in a recent letter. The power of acquiring for the purpose of Government offices the extensive piece of land, which at present is occupied by small houses, was in process of being sought when the late Government was succeeded by the present. There was some fear that the new Government would, perhaps, not follow up the policy of its predecessors in continuing the effort to obtain better office accommodation. But so patent is the need that the scheme is to be proceeded with at once, and it only remains for a few unimportant leases to expire and for the committee just appointed to decide in what way the sites available can be most advantageously utilized. At present there are two blocks of buildings which form the great part of the Government offices. One of these, the smaller of the two, was built partly by Sir John Soane and partly by Sir Charles Barry. It fronts upon Parliament Street and accommodates the Treasury, Privy Council and Education Departments. Separated from it by Downing Street is an enormous block, built by Sir Gilbert Scott. This building contains the Home, Colonial and Foreign Offices, the Local Government Board and the India Office. The Admiralty is the only other Department which has regular accommodation, having lately moved into a new block, built from a design obtained in open competition. The War Office is said to carry on its work in a "rabbit-warren" in Pall Mall, while the Boards of Trade and Agriculture, the Fish and other offices are scattered about quite unaccountably. There are two important sites to be acquired and it is expected that each of them will be utilized for Government offices. Both sites are in Parliament Street and the first occurs at the southern end — a large site, of which a small part will be left unoccupied in order to bring the street to an equal width throughout. Offices for the Board of Trade are likely to be placed here, and room for several small departments will probably be found. The other site is almost half way between Parliament and Trafalgar Squares and was occupied originally by Lord Carrington's House. It faces the Horse Guards on the front, and Inigo Jones's Banqueting Hall (now the United Services Institution) on the side. The site has now for some time been cleared and fenced-in by a hoarding, unlovely and unrelieved by posters, artistic or otherwise. This to the pedestrian. To the observer from the omnibus top the site comes somewhat as a shock, for in the centre of London there he may see banks of bracken and pink-campion, cow-parsely and ragged-robbin, growing with extraordinary luxuriance. And the conquest of the site in this way by wild flowers is all the more remarkable, because the house which originally stood here was possessed of little or no garden. This site will probably be given up to the accommodation of the War Department. It is understood that a large amount of money is to be appropriated for these buildings; in fact, the cost of the acquisition of the land is only a little more than the estimated cost of the buildings, each being over £1,250,000. The total expense is estimated at not less than £2,642,000. Nothing has been said, as yet, about the method by which an architect is to be chosen for the work. In all probability it will be by competition. If this be so, it is to be hoped that the conditions will be favorable and with as little restriction as possible, and that in the execution there may be none of the persistent official interference that contributed to hurry Mr. Street into his grave during the building of the Law Courts.

A constitutional difficulty has arisen in connection with the election of Fellows to the R. I. B. A. Some years ago, when the exam-

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ination system was instituted, a by-law was inserted which stated that none, thereafter, should be qualified to become Associates who had not passed the examinations. No such restriction was placed upon the election of Fellows, the by-law standing that if a poll should be demanded, one adverse vote should cancel four in favor. A year or two ago, it became evident that a large section of the Associates were incensed by the appearance on the list of proposed Fellows, of the names of gentlemen who had unsuccessfully attempted to pass the examinations. A poll was demanded with the result that the candidates were promptly blackballed. The Associates then organized themselves and thenceforth scrutinized very closely the lists of proposed Fellows which from time to time were submitted. Any gentleman who had neither passed the examinations nor in practice had done important work was unlikely to meet with a welcome. The result of this was a falling-off in the numbers of the Fellows, for men of position hesitated to come forward in face of the risk of blackballing — a blemish upon their dignity if not upon their reputation: at the late dinner of the R. I. B. A., held in Manchester, the President of the Liverpool branch, Mr. G. Bradbury, distinctly stated that such were the considerations which had held him back from seeking to become a F. R. I. B. A. He had, he said, been in independent practice for twenty-two years and had been a member of the Liverpool branch of the R. I. B. A. for twenty-four years. The effect of being rejected by a body of Associates who, he could easily imagine, had not heard of his work, was, in view of the position he held, far too serious to warrant the risk. The position of parties upon the Institute roll is as follows: Fellows, 588; Associates, 933. During the eight years ending 1893, the Fellows were increased by 222 members; from 1893-5 a falling-off of twenty-seven was registered. The Associates have increased by 222 members during the ten years ending 1895, but the last two years exhibit the contrary to the decrease amongst the Fellows. The Council of the R. I. B. A. is quickly moved by any action which affects its finances, and it now seeks to remedy the evils. Mr. Penrose has suggested that the elections should be carried out by the Council alone, without appeal to the body of members. This would be a revolutionary step, difficult to justify, and it is certain that the Associates will not abandon their powers without a struggle. A sub-committee recently appointed to consider the matter reports unfavorably upon his scheme, but proposes that each adverse vote shall, in the future, cancel only two votes in favor. There is not a doubt that the Institute numbers among its Fellows gentlemen who have done nothing to attach to them whatever dignity subsists in the Fellowship; nor that from time to time the Council appears to assume a careless attitude towards the Institute's interest in the matter. The difficulty would doubtless be solved if the Council, who nominate their successors, would approach the younger element of Associates in a more liberal spirit, accepting a greater number into the body of the Council and seconding the effort of the Associates to endow the Fellowship with a proper dignity. It is certain that no interest, architectural, educational or social, will be advanced by any attitude of intestine quarrel.

I had occasion in a recent letter to call attention to a proposed piece of vandalism — the destruction of the Trinity Almshouses on the Mile End Road, E. The proposal was met by a storm of popular protest, and it is a pleasure now to notice that the opposition has not been without effect upon the Charity Commissioners who sat to consider the question. They have decided that the destruction is unwarranted. With a view, no doubt, of maintaining the interest which the question has aroused, and, in part, as a memorial of a victory over opportunism, there has appeared an interesting monograph on the subject from the hand of Mr. C. R. Ashbee, M. A. The book deals with the whole question of the Trinity Almshouses and chiefly from an historical aspect. The title indicates its scope — "*The Trinity Hospital in Mile End — an Object-Lesson in National History.*" After touching upon the status of a mediæval guild, which has survived and developed into the Corporation of Elder Brethren of Trinity House, Mr. Ashbee goes on to state what he has been able to discover in connection with the history of the Hospital. He cannot actually assert that Wren designed the buildings, but he finds strong evidence of Wren's influence, and considers that the houses are, at least, his part creation. Reproduction of some sketches are given, greatly increasing the interest of the book, and the work is completed by the addition of a few of the most important letters included in the recent correspondence upon the proposed demolition. The book is published at the Guild of Handicraft, Mile End, E, of which Mr. Ashbee is Honorable Director. The publication at this particular period is, no doubt, the acceptation of an opportune moment, but the work is only one of a series of illustrated monographs which are to be prepared upon buildings of antiquity in the district of East London and Southwest Essex. The organization which has combined to do this is styled "The Committee for the Survey and Registration of the Old and Interesting Buildings of Greater London and Essex." The Committee was formed during 1894-5 and contains many well-known names, such as Walter Crane, William Morris, Hamo Thornycroft, R. A., Sir Walter Besant, etc., while the late Lord Leighton held, until his death, the office of President. The objects of the committee are concisely contained in its title. They are: to survey the old buildings of Greater London, with particular reference to the northern and eastern parts, including Southwest Essex; to prepare a series of illustrated monographs of about a dozen of the most interesting buildings contained in those districts, and to enter a protest against the unnecessary destruction of any building of historical or antiquarian importance. This survey is really only the third part of the work which, at the initiative and under the direction of Mr. Ashbee, is carried on at Essex House, E, a fine old residence in the Mile End Road, Whitechapel. The Guild of Handicraft of Essex House, sprung from a very small gathering of admirers of Ruskin and his teaching, consisted in 1886 of three members. It has since grown into a society of importance with a two-fold work, educational and productive. Originally there was attached a technical school of considerable dimensions, the guiding principle of which was the teaching to young journeymen of design in its application to the several industries in which they were engaged. It was not "the School of a Hobby" but "the School of a Movement," an enemy to systems, but designed to establish a healthier foundation on which to base the education of the craftsmen. This school, owing to a persistent refusal on the part of the Technical Education Board to assist financially, has been closed; it was found impossible to compete with the State-aided Municipal schools, which have lately sprung up so generally.

The educational side of the work is, however, continued to some extent by the Guild. This latter is a society of craftsmen, who seek the nobility and advancement of English art and handicraft — not on the basis of mastership, but with coöperation as an industrial partnership. At a small profit the Guild carries out all kinds of joinery, cabinet-making, carving, leather-work, decorative painting, wrought-metal work and jewellery. The body is a well known contributor to the arts and crafts and other annual and occasional exhibitors of handicraft. It is situated in a centre wholly adapted to its work, and with such an enthusiast as Mr. Ashbee as director, it may be expected for the future, quite apart from any value it may possess as a social force, to rank very high among the productive educational organizations of the country.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

STAIRCASE DETAIL: THE GUARANTY BUILDING, BUFFALO, N. Y. MESSRS. ADLER & SULLIVAN, ARCHITECTS, CHICAGO, ILL.

[Gelatine Print, issued with the International and Imperial Editions only.]

A GROUP OF COUNTRY HOUSES. MR. J. A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.

FIREPROOFING TESTS OF UNPROTECTED COLUMNS.

SEE report published elsewhere in this issue.

APPARATUS USED IN CONDUCTING THE ABOVE TESTS.

SKETCHES BY MR. W. T. PARTRIDGE, LATE HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP.

[The following named illustrations may be found by reference to our advertising pages.]

SGRAFFITO DECORATION, 103 VIA TOMACELLI, ROME.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO XXVI: STAIRWAY APPROACH TO THE VILLA D'ESTE, TIVOLI, ITALY.

XV CENTURY SGRAFFITO IN COURT-YARD OF THE COLLEGIO PENITENZIERI, PIAZZA SCOSSA CAVALLI, ROME, ITALY.

[Additional Illustrations in the International Edition.]

LOWER STORIES OF THE GUARANTY BUILDING, BUFFALO, N. Y. MESSRS. ADLER & SULLIVAN, ARCHITECTS, CHICAGO, ILL.

[Gelatine Print.]

CORRIDOR IN THE SAME BUILDING.

[Gelatine Print.]

BITS OF "OLD BERLIN" AT THE BERLIN INTERNATIONAL EXHIBITION. HERR KARL HOFFACKER, ARCHITECT.

THESE and the following illustrations are copied from the *Deutsche Bauzeitung*.

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MAIN BUILDING AND MAIN RESTAURANT AND WATER-TOWER, BERLIN INTERNATIONAL EXHIBITION. HERR BRUNO SCHMITZ, ARCHITECT.

SALOON OF THE ROYAL MAIL STEAMER "GOTHIC," OF THE WHITE STAR LINE.

NOTES AND CLIPPINGS

The Height of Factory Chimneys. — The notion that the greater the height of a chimney for a boiler plant the greater will be its draught-producing power is responsible for the existence of many chimneys of imposing size and, at the same time, unnecessary expense. A very tall chimney, well proportioned and gracefully outlined, may be a striking architectural adjunct to a factory, but it is also one that costs considerable money without doing any measurable amount of good. Where chimneys are intended to carry off noxious fumes from chemical works, there is, of course, some method in providing for unusual height, since the aim in such a case is to insure as complete as possible a diffusion of the vapors and prevent their mingling with the air of the lower strata; but for boilers simply unusual height, as stated, is rarely based upon a good reason. As a matter of fact, the draught-producing capacities of chimneys having flues of the same size are in proportion to the square-roots of their heights, so that if one were to have double the power, if it may be so called, of the other, it would have to be four times as high, and not merely twice as high as many would suppose. A height of 150 feet may be considered, on good authority, as the maximum necessary in any case for producing the requisite draught, providing, of course, that the area of the flue has been properly proportioned. This latter should be made to bear a pretty nearly direct ratio to the combined areas of the boiler flues connecting with it. A chimney much beyond 150 feet is generally suggestive of misspent money. — *Cassier's Magazine.*

"Sand Suckers." — As the steamers pass along St. Clair flats, between Lake Huron and the Detroit River, the passengers see numbers of old hulks anchored off in shallow water, and invariably ask the steward or one of the deck boys what they are there for. The answer always is given in a gruff and contemptuous tone, as if it were a fool's question:

"They're sand-suckers."

"What's a sand-sucker?"

"Old tubs that suck up sand."

"How do they suck up sand?"

Then the oracle looks at you and grins. He doesn't quite know whether you're a farmer yourself or are guying him, and it takes a great deal more questioning to find out the fact that a new industry has been found to utilize ancient and leaky hulks that are not fit to go to sea. The bottom of Lake St. Clair and the flats that surround it are covered with beautiful white sand, and these boats go out every morning, anchor in a favorable place near the channel, and drop overboard large hose-pipes of canvas or rubber, with iron tips, which sink of their own weight. Then they set the pumps going and suck up the sand, which brings a good deal of water with it, and is deposited in the bottom of the boat. The sand sinks, and the water rises to the surface and returns to the river through holes pierced for its accommodation. Thus, before sunset, the hatches are filled with pure, clear sand at a nominal cost, which is unloaded at Detroit and sold for building purposes. Formerly there was a community of Frenchmen who made a business of gathering this sand and hauling it to the city, but they had to work very hard, because of their ignorance of hydraulics and their lack of boats. They poled and rowed up flat boats, which they would fill by jumping overboard in shallow water and shovelling in the sand. They would work a month with the water up to their waists and not get as large a cargo as a modern sand-sucker, operated by two men, can pick up in a single day. — *Chicago Record.*

Papyrolith. — An innovation in the construction of floors is the use of a special preparation of paper pulp invented by Otto Kraner, of Chemnitz, Saxony. He calls the new material papyrolith. It comes in the shape of a dry powder which is mixed with water, dries in a short time and may be spread and planed down upon a foundation of either natural or artificial stone, cement or wood. The wearing quality of papyrolith is very remarkable, as are also its qualities of being solid and without a crevice, a bad conductor of heat and deadening all noise. A further advantage is the considerable amount of elasticity which it possesses and perfect safety from fire. Since the mass may be tinted with almost any color, it is possible to lay down several layers in different colors along side of each other, or to lay a floor with a mosaic design. Parquets with vari-colored borders can also be laid down, and the same material may be used for wainscoting and stucco work, as also for panels and other decorative and architectural purposes. Mr. Kraner has also recently succeeded in producing a material similar to Lincrusta-Walton at only one-tenth the cost of that expensive material. — *Scientific American Supplement.*

Much Ado about — Nothing. — A certain Prince of Orange was Generalissimo of the Austrians at the end of the last century. He fought against the French in Italy, died, and was buried at Padua, (1799). For four years the Dutch Government has been in treaty for the Prince's remains, and after an endless amount of diplomatic negotiations and correspondence, matters were arranged, a Dutch man-of-war arrived in Venice, and, after another three weeks' delay, surmounting the last difficulties raised by the Church and red tape of the Italian Government, a day was fixed for opening the tomb, and conveying the remains to Venice, to be transported by the man-of-war, and ultimately deposited in the family vault at Delft. It was a most impressive ceremony. A representative of the Queen of Holland came expressly. Admirals, generals, officials galore, special trains, funeral-car, troops lining the way, minute-guns and flags half-mast high, and then the tomb was opened, and contained — nothing. — *London Truth.*

Cathedrals in the Fen Country. — The special wealth of the Fen country in churches of the highest class, some of them almost cathedral-like in dimension, far exceeding the needs of the sparse agricultural population now around them, must impress us with something like astonishment when we remember that building-materials, whether stone or timber, were necessarily brought from less watery districts. In the course of some drainage operations in Lincolnshire many years ago, an ancient barge was discovered laden with blocks of stone. Its timbers were black with age and long immersion, like the well-known "Fen oak," and there can be no doubt that it had been accidentally sunk in the "leam" or water-course, dug, perhaps, for the express purpose of conveying heavy materials by water carriage to one of the churches or abbeys in course of construction five or six centuries ago. — *Good Words.*

Utilizing Iron Sands. — A way has been found of turning the iron sands of Taranaki, in New Zealand, into commercial iron and steel. The sands extend over 40 miles of beach, many feet deep and stretching out 300 yards below low water. They consist of magnetic iron perfectly free from sulphur, phosphorus and other impurities except a small percentage of titanium. Cheap coal can be had not far away, and lime and clay are near by. Hitherto all attempts to utilize the iron have proved futile. By the new method bricks made of 160 parts of iron sand with fifty parts of yellow clay and 50 parts of blue clay are put in the furnace with briquettes made of coal breeze, raw bituminous coal, slag cement and coal tar. — *Providence Journal.*

Erdmann Encke, Sculptor. — Erdmann Encke, the sculptor, who died in July at New-Babelsberg, near Potsdam, was born in Berlin on January 26, 1843, where he studied at the Royal Academy, and afterward in the studio of Albert Wolff. His first noteworthy work was the great bust of Friedrich Ludwig Jahn, in bronze, for the Gymnasium on the Hasenheide, at Berlin. Herr Encke's subsequent works embrace a statue of the Great Elector for the Berlin Town-hall, the splendidly executed marble statue of Queen Louise, which now adorns the Thiergarten, and statues of the Great Elector and Frederick the Great in the Royal Arsenal. In 1881 he was elected a member of the Academy and of the Senate, and in 1883 the title of Professor was conferred upon him in recognition of his eminent qualities. — *N. Y. Times.*

The Never-finished Arundel Castle. — Talking of building, there is no one more peculiarly placed than the Duke of Norfolk. Hundreds of years ago one of his ancestors bequeathed in perpetuity a tract of land along the Thames, the revenues of which were to be devoted exclusively to the maintenance, repair and additions to the Ducal Castle of Arundel, in Sussex. This land is now in the centre of London, in the neighborhood of the Strand, covered with houses and yielding such vast rentals that the unfortunate Duke is at a loss how in the world to devote these exclusively to the castle which is already the most magnificent thing of the kind in Great Britain or in Europe, one inconvenience being that the castle is never under any circumstances free from scaffolding, workmen and decorators. — *Marquise de Fontenoy in Philadelphia Press.*

The Paris Opera-House dangerous. — The discovery has been made that the Opéra is the most dangerous theatre in the French capital. Apart from certain perils attached to the defective arrangement of the electric lighting, none of the regulations ordered after the Opéra Comique disaster has been carried out. It is estimated that there are 20,000 tons of inflammable scenery piled up in such a way that it takes four days to dislodge a scene required. There is no iron curtain, and the dwellers in the building cook their food and light fires in every corner. Parisian opera-goers may well feel some alarm when they hear that there have been no less than 150 outbreaks of fire in ten years. — *New York Times.*

Yale-lock Combinations. — The Yale-lock manufacturers have proved that in a patent lock having six "steps," each capable of being reduced in height twenty times, the number of changes or combinations will be 86,400. Further, that as the drill-pin and the pipes of the keys may be made of three different sizes, the total number of changes will be 2,592,600. In keys of the smallest size the total number of changes through which they can be run is 648,000, while in those of large size the number can be increased to not less than 7,776,000 different changes. — *N. Y. Evening Post.*

The Porte de la Cunette, Paris. — The excavations recently made in order to make a bridge connecting the foot-bridge at Passy with the Boulevard de Grenelle have just brought to light one of the water-gates which, under Louis XIII, connected the Seine with the ditches round the fortifications. It served for a custom-house station, and small traffic coming down the Seine passed up this tributary into the neighboring districts. The Porte de la Cunette, as it was called, is remarkably well preserved, but will have to be removed. — *Paris Daily Messenger.*

Cost to Hamburg of the Cholera in 1892. — It has taken the Hamburg authorities four years to ascertain the exact cost of the cholera epidemic of 1892 to the city. It is $1,140,660 in direct expenses. — *Exchange.*

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EVIDENCES accumulate that the next two or three years, if the financial uncertainty which has so long hung over business should be dispelled as a result of the election, will be years of great building activity. Although little is being done now in the way of building, architects will probably agree that there has seldom been a time when so many important building projects were being cautiously discussed, or suggested as worthy of investigation, as now. Plans have been made by architects for many million dollars' worth of buildings, the execution of which has been postponed for the present, on account of the impossibility of financing any extensive scheme of the sort; and the projects which have gone so far as the preparation of plans are, we venture to say, few in comparison with those which have only reached the stage of preliminary discussion. It is true that a great many projects which are discussed are never carried out; but present circumstances, apart from the financial uncertainty, are unusually favorable. Materials are cheap; money, apart from the influence of currency alarms, is abundant; real-estate investments, which have shown remarkable steadiness under circumstances which have stripped hundreds, perhaps thousands of millions of dollars from the value of stocks and bonds, are in high favor; and, for several years, construction, except in the item of office-buildings, has not kept pace with the normal increase in demand. A revival of confidence will inevitably be followed by a rapid extension of business, and the extension of business will find itself hampered, in nearly all our cities, by the lack of good modern stores. A renewed demand for these will find owners glad to supply it, and the construction of new stores in cities always means the provision, in some other locality, of dwellings for the people whose houses are turned into stores. All this involves business for builders, building-workmen, material-dealers and architects, and as their productions have proved, in these trying times, to be the best and safest of investments, it is likely that they will continue to be so regarded for a long time to come.

THE *Evening Post* finds in the great increase in the number of mechanics' liens recorded an indication that fraudulent speculation in real estate is becoming more common, and it warns its readers against dishonesty of this sort. Architects are not often victims of such frauds, and are still less frequently participants in them, but it will do no harm to put them on their guard against adroit and plausible schemes. The first step in an operation of this kind is to secure land, generally in some popular locality. The land is paid for in full, and a builder of the right sort is next sought for. The right sort of builder is one who has already ruined himself by real-estate speculations on his own account, and, while himself irresponsible, has an extensive acquaintance with dealers and mechanics. If he has a somewhat imposing presence, a suave manner, and a natural taste for trickery, so much the better. After securing the coöperation of such a personage, the land is conveyed to him, the consideration named in the deed being far in advance of the true value, and a mortgage-deed is given back by him to nearly the same amount; the grantor agreeing at the same time to advance money for building, the advances to be added to the mortgage debt. The speculator holds now a first mortgage for far more than the value of his security, and the succeeding stage of the game consists in inducing outsiders to add to the value of the security at their own expense. This is done through the builder, who commences operations by procuring plans, and contracting for work and materials. Sub-contractors and material-men who hesitate to trust the builder are shown the agreement for a building-loan, in which the mortgagee promises to advance the money to make the necessary payments. If any of them are cautious enough to go to the mortgagee, they are assured that he knows very little about the affair, but that he is ready to make the advances as agreed. This assurance seems to them satisfactory, and they go on with the work. The first payments are made promptly, and, encouraged by this, they exert themselves to finish their work and get the rest of their money. As the building operations approach completion, payments are slower, and, by the time the work is substantially done, a large sum is still due, and it then appears that there is trouble between the builder and the mortgagee. Finally, the latter forecloses his mortgage, cutting off all liens, and leaving the sub-contractors and material-men to get their pay from the builder as best they can. The builder, who is generally either an experienced bankrupt or a young man with little capital, who has himself been deceived, divides his small assets among the creditors under insolvency proceedings, and is then ready to embark in a new operation. It is evident that the mortgagee, although it is necessary for him to advance a good deal of money, cannot lose anything, and is sure to make a large profit, if he manages the operation judiciously. The main point is to put off the foreclosure until the building is nearly completed, at the same time contriving to keep back all the payments possible. Then, if the creditors, as is often the case, bid the property in at the foreclosure sale, the mortgagee gets all his money back in cash, including the profit shown in the pretended sale of the land; and if, for want of bidders, he is obliged to bid it in himself, little more is needed to make it ready for the market, and a subsequent sale at actual cost brings him in a profit equal to the amount out of which the sub-contractors and material-men have been defrauded.

SPECULATIVE operations of this sort have been very common in Germany, particularly in Vienna, where building work is generally at a large scale; but the fashion has become thoroughly acclimated here, and such schemes are constantly carried out, not only in the cities, but in the suburban towns, where the unscrupulous possessor of five or ten thousand dollars appropriates the property or labor of the small local dealers or workmen as mercilessly as the millionaire speculator of the great cities defrauds the reputable contractors of their thousands or tens of thousands of dollars apiece. Great as the evil is, there seems to be no legal way of remedying it. There is no question of the right of a man to sell land for whatever price he can get, whether it is more than he paid for it or not, and he has an equally good right to take back a mortgage for the amount of the purchase price, and to agree to advance money for building. All this may be done, and is constantly done, in good faith, and to the advantage of all concerned; and the only difference between an honest and a dishonest transaction of the kind consists in the fact of the collusion, in the latter sort, between the buyer and seller to defraud innocent people. This collusion is very difficult to prove, so difficult that it would in most cases be useless to attempt to do so; and contractors and dealers who wish to avoid being made the victims of such operations should hold fast to their only real security, the responsibility of the builder with whom they make their contracts. The warning cannot be repeated too often, that any one who trusts a builder of unknown or doubtful reputation does so at his peril, and the best way to check

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fraudulent building speculations is to refuse to deal with parties not known to be responsible except on a cash basis. In fact, a contractor who has unintentionally been entrapped by schemers of this class may sometimes save himself by invoking the aid of that good angel of business, solid cash. It is evident that the speculator's interest lies in getting the building nearly or quite completed before seizing a pretext to foreclose his mortgage, and a contractor whose payments are not made as agreed, and who has reason to suspect treachery, may sometimes escape loss by demanding weekly payments in full for the work done, as a condition of continuing his labors. The speculator, in such cases, will often be willing to satisfy the demands of one contractor, rather than risk a rupture which would attract the attention of the other contractors, and might result in the abandonment of the whole work, and the prudent man will reap the reward of his caution, while his fellow-contractors will be at least no worse off than they would otherwise have been.

A CURIOUS form of speculation has been developed of late, consisting in the purchase and sale of storage-warrants for pig-iron, which are transferred and negotiated in the same way as warehouse receipts for cotton, or silver certificates, or elevator receipts for grain, the purchaser never seeing the actual metal which he owns, but holding simply an order on a certain storage-company for the delivery of a given number of tons of iron of a specified quality, for which he pays a certain price, and which he can assign to any one else at such price as he can get. Of course, there is no reason why this convenient and economical method of making transfers should not be applied to the iron business, as well as to transactions in cotton or grain, and the United States, which is now the largest iron-producing country in the world, will probably find the system of great value. The only difficulty would appear to consist in the numberless variations in the quality of pig-iron, which make it more important for the consumer to see the actual goods before purchasing than in the case of cotton, or wheat, or silver; but a warehouse-man thoroughly acquainted with iron and its uses may perhaps be able to make a classification which will satisfy everybody, and if this can be done, both consumer and manufacturer will be benefited by a system under which the former is sure of being able to get the grade of iron that he wants, at the price quoted in the Exchange reports, without spending his time in running from one smelting-furnace to another, to get the quantity and kind that he needs, at a price determined by hours of haggling, while the latter is sure that his iron, being classified by the warehouse-man, and represented, in common with all similar iron, by the warrants, will find its way to the consumers who wish for that quality, without the necessity for sending around a drove of salesmen to bring it to their attention, and without any loss of time in dickering about the price. It is likely that, as in the case of grain and cotton, the tendency of the warehouse system will be to diminish the average cost of iron to consumers; but it does not follow that the producers will receive less for it, as they will save a large outlay for salesmen and general expenses; while the fluctuations in price, which are now enormous, and as prejudicial to the producer as they are to the consumer, should be materially diminished by a good storage system.

A FEW weeks ago, the *British Architect* published a drawing of a modern church, with open-timbered roof, the hammer-beams in which served to support figures of angels, who were shown as sitting comfortably on the ends of the hammer-beams, with their backs against the curved braces. Now, there is certainly no objection to making the ends of the hammer-beams serve as pedestals for sitting statues, but something more than artistic propriety is necessary to make any detail of church work acceptable to the British public; and several critics at once rushed into print to say that there was no mediæval precedent for placing sitting figures of angels in a church roof; while another set of critics claimed that there were precedents of the sort, but without saying where. In the last number of the *British Architect* received, Mr. Harry Hems, of Exeter, the noted carver, who is, of course, very familiar with ecclesiastical work, new and old, repeats, in a most lively and amusing letter, the observation which he had previously made, that there is no ancient precedent for sitting figures of angels in a church roof; and that those who claim that such precedents exist would be unable to point one out.

MR. HEMS is excellent authority on such matters, and it seems altogether probable that he is right. The most ancient and beautiful fashion of all seems to have been that of projecting the hammer-beams a few feet beyond the braces, and carving the free end into a figure of an angel, hovering horizontally, with wings almost closed, above the congregation. A great number of roofs were designed in this way in the fourteenth and fifteenth centuries, but, unfortunately, the Lord Protector Cromwell and his men had an antipathy to angels, which they gratified by sawing off the winged hammer-beam figures in such timbered-roof churches as they could get at. Curiously enough, the amputated stumps that they left came to be regarded by many people as the true original type of hammer-beam; and many modern open-timber church roofs are designed with hammer beams richly moulded on the edges, but chopped off square at the ends, in close imitation of what their authors suppose to have been the beautiful simplicity of mediæval taste. After the horizontal angels, carved out of the solid of the hammer-beam, had gone out of fashion, it became common to apply to the ends of the hammer-beams, and often to the moulded wall-plates between the trusses, half-figures of angels, nearly upright, with outspread wings, often holding something in their hands. This seems to have been the last form in which the mediævals used angel figures in timber roofs. There is, however, no reason why the moderns should not try other types, and if the beautiful fashion of carved open-timber roofs should be revived, it is to be hoped that they may be made, by their design and decoration, as interesting and instructive to the critical modern congregations as their prototypes were to the simple peasants of the fourteenth century.

A REAL Raphael has come into the hands of a London picture-dealer in a singular way. In the year 1504, when Raphael was not long out of his pupilage with Perugino, he was engaged to paint an altar-piece for the nuns of the Convent of Sant' Antonio, at Perugia. He began the picture, which is in two parts, consisting of a panel nearly six feet square, and a semicircular lunette over it, but was interrupted by his journey to Florence. The next year, after his return from Florence, he completed his work. In 1677, the picture was sold by the convent for about two thousand dollars, to Antonio Bigazzini, a Perugian noble, and he disposed of it to the Colonna family, of Rome. The Colonnas afterwards sold it to the King of the Two Sicilies, and it became one of the ornaments of the palace of the Caserta, at Naples. In 1860, King Francis was besieged in his palace, but escaped to the fortress of Gaëta, and took his picture with him. From Gaëta, after his abdication of the throne, he retired to Spain, still accompanied by his picture. Unfortunately, even kings sometimes have to give chattel mortgages, and the Raphael had been pledged as security to a banker, who had received from the King the title of Duke of Ripalda. The banker claimed his security, and the picture was turned over to him. He sent it soon afterwards to Paris, to be brightened up and made salable, and the restorer whom he employed for this task fulfilled his duty by repainting considerable portions of it, including the faces of the personages. Thus renovated, it was offered to the authorities of the Louvre, who refused to purchase a picture which had been subjected to such treatment. The directors of the National Gallery, in London, also declined to buy it, for the same reason. At last, it was deposited in the South Kensington Museum, where it remained for several years, until Mr. Martin Colnaghi ventured to buy it from the representatives of the owners. He had the picture carefully treated, and succeeded in removing all the Parisian paint of 1862, finding even the varnish beneath nearly intact. The picture is now, therefore, nearly in the condition that it was left by Raphael, and is said to be a work of great beauty. Mr. Colnaghi has offered it again to the National Museum, at a very reasonable price, and the authorities are said to be seriously considering its purchase. As it is hardly likely that such an opportunity will occur again for many years, if ever, it seems as if some rich American might do his country a great service by buying the picture and bringing it over here. There is no important Raphael in the United States, and such a picture as this would become the object of pilgrimages from all over the country.

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THE CHATEAU DE BLOIS.[1] — II.

THE WING OF FRANCOIS I. — II.

FRANCOIS I inherited but little of the sendentary tastes of his predecessor and his continual change in residence and affection reveal the inconstancy of his character. That Blois received any consideration from him is due as much to its convenience as to the love of his queen for this her home, and for its people.

The Château and its dependencies constituted a portion of her *dot* at her marriage in 1516, and a deed, still extant, which conveyed to her the Comté de Blois, and several documents in which she is styled *Comtesse*, dated this same year, lead one to infer that her home was the gift of her chivalrous husband.

The King began this same year the construction of that beautiful part of the Château known under the name of the "wing of François I." Among the archives of the baron of Joursanvault exists a manuscript fixing definitely this date:

"Je, Raymon Phelippeaux, commis par le Roy à tenir le compte "& faire le payement des baſtimens, édiffices & réparacions que ledit "ſeigneur fait faire en ſon chaſtel de Blois, confeſſe avoir eu & receu ". . . la ſomme de trois mille livres tournois . . ., le cinquieſme "jour de juillet, l'an mil cinq cens & ſeize."

In 1524 Queen Claude died at Blois at the age of twenty-five, and her eight-year-old daughter, Charlotte, immediately followed her.

It is not probable that any new work was begun after these events. The taste of the king now leaned so strongly towards Chambord as to lead him to say in setting out for that château, "*Je m'en vais chez moi.*" The last document bearing the seal of Blois under his hand bears the date 1534, and a few years later the library, at this time comprising 107 printed volumes and 1,700 manuscripts, was removed to the "home" of François I.

Entering the principal story from the grand staircase, one finds himself in a large room, the Salle des Gardes, at one time the Council-chamber. At either end are the two well-known Renaissance mantels, and a charming little door leads into what we have seen, from the plan, to be the north addition to this wing. The room to the right of the Salle des Gardes, though the richest on the exterior, has a simple Gothic mantel showing clearly that the Renaissance restorer had not completed the work. A secret staircase in the thickness of the wall was closed during these alterations, though the work of the present century has brought it again to light.

Of the rooms to the left of the Salle des Gardes, we know nothing save through tradition, which assigns Henri II a bedroom there, while the Renaissance chimneys shown in the elevation of Du Cerceau's would indicate a change or restoration of the interior. The small door in the Salle des Gardes opens on what was formerly a balcony of the circular staircase adjoining, which leads from the terrace to the *chemin de ronde* of the old fortress wall. The ceiling of this little recess and soffit of the stairs exposed at this point are richly decorated, and a small window, half-way up the run, still retains its carved pilasters on the exterior, to show which the modern restorer has left a little pocket.

The north addition, to which we enter through this former balcony, contains many rooms, one of which is known as the gallery of Henri II, and a small oratory to the left and a wainscoted room on the floor above are all in the way of architectural attractiveness the interior of this wing presents.

The gallery under the roof, to which the circular staircase leads, commands a beautiful view of the city, and if one can but picture the gardens that once stretched out below, the gallery and the many loggias on this façade are fully justified.

Exploring the roof from this level, the trusses show interesting comparisons in workmanship: those over the central building are carefully hewn and reveal their Gothic origin in the sections of the accurate chamfers, while the Renaissance ones, the addition, are of as crude workmanship as one can find. The old *chemin de ronde* of the fortress can here be seen, and the old fortress tower imbedded in the addition reveals its antiquity in its thick walls. In the framing of the Gothic trusses can be seen provision for dormers, and these combined with the recesses in the old wall below afford some material for a restoration of this old façade. A Renaissance dormer on the court leads to the flat roof of the staircase and has an interesting door.

The façade on the court immediately adjoining the staircase-cage was doubtless built during the first alteration. The three stories of which it is composed are unequal in height and crowned by a heavy cornice. The sill and lintel courses are carried through by strong lines, while the vertical elements of the composition are furnished by the pilasters on either side of the windows and where, on the interior, a wall abuts, which is a decided Gothic tradition.

All horizontal bands, save the main cornice, return around these breaks, forming entablatures to the pilasters. The lines of pilasters are not marked in the main cornice, while they spring at the top of the basement story from a double console support. The base proper is formed by a simple battered wall crowned by a cavetto, a but meagre foundation. The basement windows above this are treated in the same manner as in the story over, with pilasters, which not being on the axes of those above, still further mar the foundation.

The panels formed between the lintel and sill-courses and the pilasters of the windows are sunk below the wall-line and have a richly decorated moulding close against each of these members. The centre of the panels of the upper stories is ornamented by a salamander in high relief. This emblem of François I, and the pierced swan of Claude, his wife, appear so frequently that one asks their meaning. The salamander was originally the device of the father of François I and the medals of both father and son bear the legend in old Italian, "*Nudrisco il buono e spengo il reo*," (I nourish the good and extinguish the evil). The pierced swan bears the motto "*Candida Candidis*," an allusion, or comparison, to the purity of the life of the queen. The porcupine of Louis XII with its legend, "*Cominus et eminus*," well befitted that ruler, for tradition then asserted that animal had the power of protecting itself by its spines at close quarters and of attacking by lancing them. The ermine, emblem of Anne of Brittany, is known to have been taken by chasing towards a muddy tract since it will allow itself to be killed rather than suffer a stain on its fur.

The windows of the court façade are mullioned and transomed and have both jambs and soffits panelled. The only architrave is a simple quarter-round, and while the panel moulding adjoining the pilaster appears a portion of the window treatment, it is really a decoration of the wall.

The main cornice is a Classic modillion one with dentils, surmounted by a Gothic shell ornament and consequently doubly heavy for the façade. This is still further increased by a richly carved balustrade. The various members of the cornice are ornamented and the lavishness of ornament on the balustrade is confusing.

Above the cornice appears between the dormers a short height of wall to raise the plate of the roof and allow a promenade. This is again a traditional feature, being seen in many Gothic examples and borrowed by them from the fortress. The axes of the dormers correspond with the windows below and in composition they are hardly as interesting as the ones at Chambord or Chenonceaux, but are much stronger and more vigorous than any example in their style.

That portion of the façade to the right, adjoining the Salle des États, is, as before mentioned, of presumably later date than the remainder of the façade. One is lead to this conclusion from the many existing differences in detail. The most apparent are the double transomed windows, with the ornamentation of architrave and pilasters in the upper stories and the ornament in the small frieze of the cornice. The dentils of the cornice are smaller and throughout there is evinced a desire to enrich the *motif* of the old composition, and the purity of the ornament and arabesque leads us to infer a better knowledge of the forms of the new mode, and consequently a later date.

The north façade shows also the ornamented pilaster and it is not improbable that this alteration, the section of the court façade in question, and the north addition were built at the same time. The sill-courses run through without breaking around the pilaster and the upper panels are ornamented by a diamond and circular pattern, in the middle of which the same crowned salamander, smaller in size, appears.

Examining the detail of the entire façade one finds it a Renaissance clothing of a Gothic body. In the simple design of a façade the Classic forms are readily applied, for the problems of construction are comparatively simple, while in a complex structure like the staircase all the precedents of Italy were useless to aid the French architect, whose hand was skilled in all parts of a problem the Italians dared not even attempt, and yielded in minor details only to the invasion of new forms.

That there are details bearing every Italian characteristic, one cannot deny, but beyond a few capitals and arabesques the Gothic reigned supreme in this façade, though to the mind of the Court it passed as the new mode.

Of the type of workman — architect or stonemason — in France at this time, Viollet-le-Duc says: "The artisans, Florentine or Milanais, led here by Charles VIII and suddenly placed in the midst of France, still all Gothic, could not have exercised through their influence any direct action upon the corporations of workmen habituated to produce the traditional forms of their country. . . The crowd of artisans persuaded to follow Charles VIII to France were not the cream of Italian artists, but, as always happens, those mediocre ones, who not succeeding in their own country did not hesitate to risk their fortune elsewhere. . . These artisans, imbued with the new forms adopted by Italy (probably very poor *traceurs*, *appareilleurs*), were thrown in the midst of stone-cutters and carvers versed in all the difficulties of geometry, having a perfect knowledge of sections and most complicated plans, and playing daily with these difficulties. . . Thus the introduction of the Italian art in France towards the end of the fifteenth century met with mediocre result."

Yet, on close examination of the Gothic work of the preceding period, one can find the time was ripe and nothing could approach nearer the new style about to dawn than the façade of Louis XII, on which, owing to the prejudice of Anne of Brittany against Italy, it is hardly likely a native of that country would be employed; hence the so-called Renaissance detail here used is confined to a crude Gothic copy of an arabesque and capital that are as far from the formal examples in Italy of *this* epoch as from the Gothic of France.

The arabesques on the façade of François I have a true Italian feeling in design and execution, but in fifteen years (1500–1516) and after several campaigns in Italy even an ordinary workman would

[1] Continued from No. 1073, page 21.

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make an excellent copy, since a premium had been placed on imitation.

This leads one to ask, If the soldier-artisan or artisan-soldier of 1500–1516 went to Italy, where did he go? What did he see?

In 1507 Louis XII remained six months at Genoa, then in revolt against the French. In 1509 a campaign was made against the Republic of Venice; a reconciliation in 1513, and a common alliance against Milan.

Thus if we seek for precedents, it should be at these two centres where ambassadors, soldiers and statesmen would be found of such taste as to be truly impressed by, or such courtiers as to affect that interest in the Classic which was destined to verify the prediction that "Rome should again conquer Gaul."

At this period there are records of French reprints of Vitruvius, but it is doubtful if they were used by the architects. The archives, a most reliable source of information, on investigation show less payment to foreign workmen than we imagine, and the names familiar to us as those of Italian architects become under their testimony, those of mere workers in intaglio, intarsia or mediocre sculpture. The work of the real artists on tombs, monuments, statues is recorded by the association of their names with their works through tradition and, more reliably, by records of payment made them for specific work.

At the time of the Renaissance in France, the early period of Italian art, marked by all grace and freedom of detail, had given way to the formal Classic period in which the orders appeared in all compositions.

The buildings of Venice, the Doge's Palace, the Palazzo Vendramini, 1481, the Scuola di S. Marco, 1485, and the churches of S. Maria dei Miracoli, 1480, and S. Zaccaria, 1456, were then either just completed or of so recent a date as to command attention.

The workman of Italy from twenty to forty years, which would be the most probable age of a man who would emigrate to a foreign, sometimes hostile, country, could have received his instruction under Martino Lombardo, Venice, 1457–1515, architect of S. Zaccaria, then building, and the Scuola di S. Marco, 1490, or under Bramante at Milan: the Hospital, 1480–1490, Santa Maria delle Grazie, sacristy of S. Satiro, 1490 (?), Como Cathedral (?), and on examining these works there is found by one just from France a strikingly familiar resemblance to the work of the Renaissance in that country. Is this due to the hands of the same workman emigrated and shut off from the formal tendencies of this period in Italy, or by French visiting artisans returning to repeat in a crude way the ornaments here used, as the authors of these same arabesques and capitals had done themselves years previous from original Classic fragments? Probably both, but beyond a doubt, both Milan and Venice furnished *motifs* for much of the work at Blois: and the use made thereof we shall determine later.

W. T. Partridge.

(To be continued.)

INFLUENCE OF TEMPERATURE IN OUR BUILDINGS.

With a temperature ranging somewhere between 80° and 90° in the shade, converting our rooms into veritable hot-air and vapor baths, the ordinary dweller in our towns must have been inquiring of late as to any means of excluding heat, and of rendering our buildings and houses more habitable. The resources of the modern citizen are few. He is content to shut out the sun's rays by sun-blinds of various materials, or shutters, to put an awning over his front door, to open the cold-air inlets of his ventilators, to keep his windows partly open, to betake himself to the shelter of shady nooks or refreshing trees, to cool the atmosphere of his rooms by sprays of iced or perfumed water, to indulge in bathing and cool drinks. But while he excludes the sun's rays, he at the same time shuts out his views, and his means for cooling the air, which is hotter outside than inside his house, are exceedingly difficult to carry out.

Many have asked if a modern building is capable of excluding heat to an appreciable degree, or if architects are conversant with any effectual methods on the subject? Our old houses and churches are certainly cooler than the new ones. Of this there cannot be any doubt, and why this should be so it is not difficult to explain. We hear people who are living in new houses complain of the heat of their rooms, that they are cold in winter and hot in summer; they tell you the sun's rays seem to pierce them, and that the very walls and windows let in the heat. The allegation is too true to be denied; the thin walls of the modern-built house and the quality of the bricks and roof-coverings are favorable to the heat passing through. The flimsiness of the modern wall is answerable largely for this rapid transmission of heat and cold. The older houses are built with thicker walls — at least half a brick more than the average modern house — the walls are better bonded and more compact, the mortar is harder, and they are often "battened" inside, and less transmissible to heat and cold. And how much more solid is the old roof, with its stouter rafters, its boarding and its tiled coverings, than the flimsy roof of to-day, with its heat-conducting slate surface. On the whole, it must be acknowledged the impeachment of the modern building in these particulars is well founded. Architects have not done much to render them proof against these attacks of excessive heat or cold; economy, cheap materials and modern ideas of elegance and lightness have all been prejudicial to the resistance of the structure to the weather, and of contributing to rob the modern house of its comfort and equable temperature. Anything which reduces the substance of the shell of a building, or which increases the size of its openings, must of necessity render it less habitable under great extremes of temperature. If we could all live in buildings of asbestos or slag-wool, or even of wood and mud, some compensation for this thinness might be obtained; but our prevalent building-materials, our brick, slate and glass are all more or less conductors of heat — they, indeed, form a considerable part of the outer casing of our buildings. But if we cannot build solid and thick walls as of yore, we can make them impervious to heat by other means. We can build them hollow, with a cavity of two or three inches, the outer thickness throwing off the sun's rays, and the cavity or air-space rendering the inner thickness of wall comparatively cool. Architects have a prejudice against the hollow wall: it does not impart the solidity they desire, the openings are not so easily made, and there is a loss of strength or bond — good reasons, as far as they go, for preferring the thick, solid wall. Again, the London Building Act and provincial by-laws have favored the solid wall for obvious reasons, and so it has come about that solid brick of minimum thickness is adopted, without the advantage of the old-fashioned plan of battening the inside, which materially aided the non-transmission of heat and cold. We might enter into a disquisition on the various methods of constructing hollow walls and of the materials introduced, such as external slabbing and tile-work, internal lathing, like the "expanded metal," filling the cavity with slag-wool, or other non-conducting substances; but it is enough to draw attention to the fact that all such modes are looked upon with disapproval, or are considered innovations by a large number of the profession.

Another reason why our modern buildings suffer from an excessive heat is the increase of window-openings. They are larger, and more numerous than those seen in the older dwellings. The Tudors possessed, it is true, large mullioned windows, but the glass was thicker, and not so easily penetrated by the sun's heat. In later times, especially during the Georgian era, the window space was small compared with the amount of wall area. Hospitable as our forefathers were, their hospitality was at least in an inverse ratio to the size of their windows, and it was left for a more showy age of plate-glass, and so-called "art" crazes, to make up for real urbanity by the extent of their window-openings. What with the Blusters and Showgoods of modern society, the tendency has been to introduce more glass into our houses and shops. Mrs. Brown has a great idea of display, and insists on a house with large windows, and if it is a corner house she prefers both sides to have windows, even if thereby wall-space and comfort are sacrificed. The ordinary "jerry"-builder knows this feeling and takes care to satisfy it when he builds. He puts in a large square or octagon ended bay on one side and a plain window or two in the return front. There is a lead, or more probably zinc, flat over the bay, which gets intensely hot under the rays of a noon-day sun. The upper rooms or bedrooms have also plenty of glass windows. With such a surface of glass, how can cool summer rooms be maintained? It is next to an impossibility. The transmissive power of glass compared with other materials is large; its absorbing and radiating powers, which are equal, rendering it one of the most heat-transmitting substances. The ordinary Mrs. Grundy draws down her venetians or blinds, but with little effect when they are inside the glass, as they too get hot, and it is always better, of course, to place the blind or screen outside the window, so that the glass may not receive the direct rays — a lesson which some people are long in learning. The want of attention to aspect in the planning of some houses is another mistake. Windows are placed on the south and western sides when cooler positions are available. We often find dining and drawing-rooms made unbearably hot by large windows, which let the sun in during the hottest hours of the day. In some public offices the clerks and officials suffer much from heat, and several public libraries are rendered too warm during the summer months for comfortable reading. Large side windows, or skylights and flat roofs are often the only modes of lighting warehouses, workshops, technical school class-rooms and laboratories, and free libraries, and if these openings occur on the sunny sides of the buildings, the rooms are oppressive and uninhabitable, as no ventilation or change of atmosphere can be effected without draught. In these circumstances, the architect can avail himself of external blinds, screens, double windows and roofs, so as to cut off the sun's rays as much as possible from the interior — preventive measures which are seldom adopted, however, to the extent they deserve. The extraordinary extremes of our climate, it will be said, render it impossible to adopt features which are used in tropical countries that will equally serve the exigencies of an Arctic season. No doubt. We may adopt Indian verandas and felt roofs, the overhanging eaves and wooden roofs of Burmah and Japan, which would be quite unsuited for our winter; we may combine these tropical Asiatic features with the high roofs and large windows of Northern Europe, and produce a kind of hybrid. Extremes meet, as they have in some of our architectural styles, which are elastic enough to be employed anywhere between the Arctic Circle and the Tropic of Cancer. Even the veranda, so essential an addition to the Indian building, is equally serviceable for one in these latitudes, if it were not for our greater need of light, which often renders that feature an obstruction; but with respect to materials and the building of our walls and roofs, the same principles hold good for both extremes of temperature. Protection from both heat and cold is assured by the use, as far as possible, of non-conducting

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materials, such as slag-wool, felt, or by the intervention of an air-space in our walls and roof. In a few recent buildings the cornice — so valuable a feature in the South and akin to the veranda — has been curtailed to give more light, but we doubt whether any great advantage is thereby secured. As a shade to the walls, both from intense sunshine and a shelter from rain, it has undoubted use as a protection.

We hear of complaints, also, from householders, of the difficulty of drawing cold water from the taps during the late hot weather; the same people may suffer from frozen pipes in the winter. The inconvenience of the former arises from the plan of placing hot-water pipes close to the cold-water supply and service pipes; the remedy for which is simply to protect each set of pipes separately, so that the heat may not be abstracted from the cold, and *vice versa*. Another class of complaints come from people who frequent close and stuffy concert-rooms or churches. The windows are opened, and the consequences are cold draughts of air upon crowded assemblies moistened by perspiration. All this might be avoided by proper ventilation, by securing a change of air through inlets properly placed, and distributing evenly tempered streams of air; but nothing seems to assuage the suffering of certain people but large doses of cold air delivered in copious streams in a heated and unventilated room. The door or window on one side becomes the natural inlet, and a blow-through of blast-like strength to the opposite openings is a natural consequence. When pnuematic laws and physics generally are better understood by Mr. Smith and Mrs. Jones, we may possibly see buildings erected with a little more regard to these and other matters to which we have drawn attention. — *The Building News.*

IRON AND STEEL WORKS OF THE UNITED STATES.

THE following information respecting the development and present number of works and manufacturing plants in the iron and steel industries appears in the "*Directory of Iron and Steel Works*," recently issued by the American Iron and Steel Association, and is quoted from the *Engineer*:

Blast Furnaces. — In 1876 there were 713 blast furnaces, active or in preparation, with an aggregate annual capacity of 4,856,455 gross tons. In 1892 there were 569 furnaces, 14,550,708 tons capacity. In 1894, 519 furnaces, 16,271,027 tons capacity. In 1896 there are 469 furnaces, but their aggregate capacity is 17,373,637 tons, the steady decrease in numbers of furnaces being more than balanced by the increase in capacity of output. Thus in 1876 the average capacity per furnace was 6,811 tons per year, while in 1896 it is 37,044 tons. These figures indicate a very great change in furnace construction and management. Severe competition, better methods of manufacture, better ore and fuel, favored manufacturing localities, the constant tendency to lower prices and the crushing effects of the panic of 1893 have combined to put the manufacture of pig-iron in few and strong hands. There are 10 new furnaces in a more or less advanced stage, while 14 others have been commenced, but work upon these latter has been temporarily suspended. The four new Duquesne furnaces of the Carnegie Steel Company will be the largest in the world, 100 feet high and 22 feet wide at the boshes, the aggregate annual capacity being 700,000 tons. Of the 469 furnaces now in operation, 96 use charcoal as fuel — as compared with 118 in 1894 — and 373 use anthracite and bituminous coal and coke — as compared with 401 in 1894. The charcoal furnaces have an annual capacity of 1,098,550 tons, while those in 1894 had a capacity of 1,285,400 tons, the average capacity per furnace being 11,443 tons in 1896 and 10,894 tons in 1894.

Rolling-Mills and Steel Works. — There are now 505 completed rolling-mills and steel works, of which 463 have trains of rolls and 42 have no rolls. Since 1894, there have been 41 new works built and 22 abandoned. In January, 1896, there were five works in course of erection.

Puddling Furnaces. — The number of puddling furnaces in connection with rolling-mills — double furnaces being taken as equivalent to two single furnaces — is 4,408 against 4,715 in 1894. The greatest number of these furnaces was in 1884, when 5,265 were in operation; while 5,120 were still in existence in 1892, but since that year the number has steadily declined.

Bessemer Steel Works. — There are now in operation 44 standard Bessemer steel works, with 99 converters, including one small converter of 1,000 pounds capacity for steel castings by the Walrand-Legenisel process — as compared with 43 works and 95 converters in 1894. The total annual converting capacity is 9,472,850 tons of ingots and direct castings, against 7,740,900 tons capacity in 1894. Few direct castings are made at Bessemer steel works. There are three Clapp-Griffiths steel plants and three Robert-Bessemer steel plants, aggregating 10 converters, but these are not all in operation. Since 1894, there have been five new standard Bessemer works built and four abandoned.

Open-hearth Steel Works. — There are now 88 completed open-hearth steel plants, and four in course of construction; the total capacity in ingots and direct castings being 2,430,450 gross tons. In 1894, there were 81 plants, with an annual capacity of 1,740,000 tons, but since then 11 new plants have been established while four have been burned or abandoned. There are 35 plants equipped for making direct castings, as compared with 28 in 1894, while another plant for making open-hearth steel castings is now being built. The manufacture of steel castings has grown so rapidly within late years that it has wrought a great change in general foundry practice.

Basic Steel. — During the past two years rapid progress has been made in the manufacture of basic steel, but it is wholly confined to works which have open-hearth steel plants. A number of these works make basic steel regularly, while some make it almost exclusively. In all, about half the open-hearth steel works which produce ingots now make basic steel. The manufacture of basic Bessemer steel has no existence in this country, but the Troy Steel Company proposes to make it with three 15-ton converters at its new works on Breaker Island.

Crucible Steel Works. — There are now 45 crucible steel plants, with an aggregate annual capacity of 98,700 gross tons. In 1894 there were 48 plants and since then eight have been abandoned and five built.

Cut Nails. — In January, 1896, there were 53 rolling-mills devoted in whole or in part to the manufacture of cut nails and spikes, with 4,589 nail machines. In 1894 there were 55 mills and 5,094 machines, while in 1892 there were 65 mills and 5,546 machines.

Wire Nails. — There are 53 completed works and one plant to be rebuilt, the capacity being very much greater than that of 54 completed and one partly completed works in 1894.

Wire Rods and Wire. — There are 23 works equipped for rolling iron and steel-wire rods, the same as in 1894; while there are 73 iron and steel wire-drawing plants, as against 64 in 1894.

Plate and Sheet Mills. — These are included in the rolling-mills and steel works. There are 156 completed plants, three in course of erection and two partly completed. In 1890, before the tin-plate industry had obtained a foothold, there were 129 plate and sheet mills and three in course of erection. Most of the new mills since that time have been designed to meet the demand for black plates for tinning and terne-plating and many of the mills, which were in existence in 1890, have been enlarged or changed to meet the same demand. There are now 41 rolling-mills specifically named as making black plates for tinning, while three works of similar character are in course of erection. The armor-plate works are included with the plate works and for over two years they have fully met the exacting requirements of the Government for the supply of armor-plate for the new Navy.

Tin-plate Works. — There are now 69 completed works, four in course of erection and one is being rebuilt. Practically all these works have been built since the passage of the Tariff Act of 1890. In 1890 bright tin-plates were being manufactured at three works, terne-plates were manufactured at another plant and two tin-plate works were in course of erection. In 1892 there were 20 works making tin-plates or terne-plates and 10 works were in course of erection. In 1894 there were 56 completed works and three in course of erection.

Forges and Bloomeries. — This classification includes only the works which have wrought-iron direct from the ore and works which have blooms from pig-iron or scrap-iron for sale. Works which make blooms in connection with rolling-mills and for use exclusively in these mills, are not separately classified, as they are auxiliary and not independent works. There are now 23 forges and bloomeries — most of which are pig and scrap forges — as against 25 in 1894. In the South, where formerly there were hundreds of Catalan forges making small quantities of wrought-iron directly from the ore, there is now only one active forge of this character left. In New York there are only seven forges making iron directly from the ore, while in 1876 there were 27 such forges.

Miscellaneous Works. — The following are the number of works allied to the iron and steel industries: Stamping works, 27 completed and one being rebuilt; iron and steel bridge-building works, 74; iron and steel ship-building yards, 36; horseshoe-nail works, 13; malleable iron works, 82; cast-iron and cast-steel pipe-works, 70 completed and one being built; wrought-iron and wrought-steel pipe, riveted pipe and seamless tube works, 38 completed and one being built; locomotive works, 22; car works, 112; car-wheel works, 112 completed and one partly erected; car-axle works, 64 completed and two being built.

Natural Gas. — There are 89 completed iron and steel works using natural gas in whole or in part, of which 61 are in Pennsylvania, 22 in Indiana, 5 in Ohio and 1 in West Virginia. One Indiana plant, now being built, will also use gas. The total consumption of natural gas in works of this character is growing steadily less every year.

SICK-PAY FOR WORKINGMEN. — An interesting experiment in sick-pay for workingmen is being made in London by the Battersea Vestry. A municipal employé falling sick and unable to work receives half-pay for a period not exceeding thirteen weeks, and quarter-pay for any further period not exceeding thirteen weeks. A medical certificate of disability must be presented each week, and no employé can receive more than six months' sick-pay in one year. To prevent fraud, every employé, on engagement, is required to pass a medical examination and receive a certificate of sound health; otherwise he cannot enjoy the benefits of the system. In case of accident in the performance of duty, an employé is entitled to full pay for a period not exceeding one year, and ten shillings a week thereafter so long as he is incapacitated from work. This is organizing the civil service on a military system, of a surety. The report from Battersea is that it works well. — *N. Y. Tribune.*

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BOOKS AND PAPERS

THE well-known author of the "*Architects' and Builders' Pocket-book*" has had the happy idea of taking up the details of what we may call the practice of construction, including the consideration of the quality, as well as the use, of materials, and collecting sufficient information about them to fill two good sized volumes, of which the first, treating of "*Masons' Work*," [1] is already on sale. We cannot quite agree with Mr. Kidder's statement in his preface, that "there exists no similar work describing American methods and materials," for Professor Baker's "*Masonry Construction*" treats of American methods and materials of masonwork with admirable fulness and precision, while Mr. Clark's "*Building Superintendence*" seems to have been found sufficiently familiar to have furnished Mr. Kidder not only with a suggestion for his title, but with the originals of a dozen or so of his illustrations, and an appreciable constituent of certain portions of the text. However, the present work contains a large amount of matter which is, indeed, not to be found in any other book. A part of this consists of the results of Mr. Kidder's own observations, while another part is compiled, with excellent discrimination, from technical periodicals, manufacturers' circulars, and so on. Out of these materials, intelligently systematized, a very useful volume has been made, modelled, apparently, to a certain extent on the familiar South Kensington text-book on materials, but covering also the use of materials, the details of the inspection of work, and suggestions for writing specifications. In addition to these, or, rather, as a sort of amplification of the subject, Mr. Kidder has collected information in regard to materials and processes of recent introduction, as, for example, the new gypsum cements, known under the names of Acme, Adamant, Windsor, Agatite and so on, and various systems of fireproof construction for floors and ceilings, patented and otherwise, besides the more important innovations of the present decade in respect to foundations for heavy buildings. Although most architects know something of the Chicago system of foundations in compressible soil, and the New York inventions of caisson and cantilever supports, it is not always easy for them to refer at once, in case of need, to the details of actual examples of such construction, and Mr. Kidder's work will here be found particularly useful to them, as well as to younger men, while the systematic arrangement of its contents adds much to its value as a book of reference. After the description of each class of materials comes an account of the proper way of using them, followed by notes of the sorts of misuse which the architect is likely to meet with; and at the end of the volume is a model specification for masonwork, including a form of General Conditions. In a book of such liberal dimensions it is, of course, possible to treat at considerable length of the materials used in masonry, and Mr. Kidder has compiled his facts with much discrimination, not only from his own investigations and experience, but from official reports and other sources of unquestionable authority. Information of this sort is, as every architect knows, on occasion extremely valuable, and it has not been easy to obtain it without a search through the shelves of a considerable library, so that Mr. Kidder has put the profession under decided obligation.

THE *Portfolio* series of monographs on artistic subjects, offers, in its first number for this year, an account of "The Picture Gallery of Charles I," [2] by Claude Phillips, who has brought together a great amount of curious and valuable information about the magnificent collection of paintings amassed by Charles, who was an enthusiastic, a liberal and a judicious collector. Scattered by the fortunes of war among the galleries of Europe, many of the treasures gathered by him now enhance the splendors of art displayed in the Louvre, the Prado, the Hermitage and other museums, among these being such masterworks as Raphael's "St. George and the Dragon," Leonardo's "John the Baptist," Giorgione's "Concert Champêtre," Titian's "Entombment," Correggio's "Jupiter and Antiope," and Holbein's "Erasmus," to mention no more.

It is interesting to know that if it had not been for Cromwell, who reserved them, in accordance with the parliamentary resolution to that effect, the cartoons of Raphael and Mantegna's "Triumphs of Julius Cæsar," would also have been lost to England, when the late monarch's collection was sold by the Commonwealth. Though the cartoons have since been transferred to South Kensington, the "Triumphs" still remain at Hampton Court, where the Great Protector placed them, in company with some other pictures, certain of which are illustrated in this monograph, which also contains good reproductions of other paintings once possessed by King Charles.

Mr. Phillips has not forgotten to give some account of Charles's patronage of Rubens and Van Dyck, and has produced a book which well merits a place among the histories of art. The publishers have brought it out in a fitting manner and have added to the satisfactory "half-tone" cuts, four admirable photogravures from Titian's "Alfonso of Ferrara and Laura de' Dianti," Dürer's "Portrait of Himself," Andrea del Sarto's "Holy Family, with an Angel"; and Van Dyck's "Madonna of the Partridges."

MISS CECILIA WAERN has written the succeeding number of the *Portfolio* monographs, which is devoted to John La Farge, [3] and describes his work as artist and writer. Born in New York about sixty years ago, the son of a French soldier who was a refugee from San Domingo, La Farge seems to have been intended for the law, but his artistic bent led him to study in Paris under Couture, and later to become the pupil of William M. Hunt.

He painted flowers, landscapes — among which those done at Newport, R. I., are best known — and figure-pieces, the "St. Paul at Athens" being the most notable of the latter, and drew illustrations on wood. His first decorative work of any importance was that in Trinity Church, Boston, a commission which he owed to his friend, the architect, Richardson, and which unfortunate exigencies compelled him to carry out in a little over four months. This was in 1876, his next undertaking being the decorative paintings in St. Thomas's Church in New York (of neither of these does Miss Waern's book afford any illustration), which was followed by the frescos in the Church of the Incarnation and the Church of the Ascension, both also in the American metropolis. La Farge is now engaged upon the decoration of the chancel in the Church of the Paulist Fathers in New York, a work of great size.

His remarkable achievements in stained glass, as exemplified in the "Battle Window" in the Memorial Hall of Harvard College and in the windows of the Vanderbilt houses, are widely known. Among the later manifestations of his art are the water-colors produced during his visits to Japan and to Samoa, and he has published a series of letters written from the first-named country, and a book entitled "*Considerations on Painting*."

Miss Waern's monograph, with its numerous excellent illustrations, deserves a wide acceptance as an authoritative and valuable record of the work and aims of one of the most vital personalities among the artists of our time.

IN the course of a conversation with one of our leading electrical engineers, the question was asked what one book could be taken as most fitly illustrating the present state of electrical science in its relation to the architect's work. The answer was that there is no work which is thoroughly up to date; that the science is changing so rapidly that before a volume could be prepared and put in print a great deal of the subject matter would be obsolete and many of the appliances therein described would be superseded by more improved machinery. There is no department of science which has witnessed such marvellous and rapid developments as electricity, and it is correspondingly difficult to keep track of all that has been written upon the subject or even to keep fairly well posted upon the current practice. Prof. Crocker's work [4] is intended for engineers and students and assumes to be a species of text-book, but it would seem to us rather a collection of admirably written advisory essays upon certain features of the subject. The work assumes a higher degree of knowledge on the part of readers than is customarily found even among the electricians who undertake to lay out work in our large buildings, and there is an absence of definition of terms and a superfluity of merely technical words, which go a long way towards making it not only difficult reading but obscuring the practical value of such a work. It avoids the mass of elementary facts which have been worked out in connection with electrical science up to a period of about ten years ago, and therein the scheme of the book is excellent; but it is to be regretted that the more recent nomenclature and methods which have gone so far as to make electricity an exact science should be so broadly assumed by the author without at least some explanation. On the other hand, the writer evinces the most thorough grasp of the subject and there are very few statements or descriptions in the volume which can fairly be challenged. It is full of valuable and accurate information for the advanced student or for the engineer, and for such it is strongly to be recommended. The chapter on buildings for electric-light is quite superfluous. The complexity of electrical science has hardly rendered electric-light buildings especially complicated or diverse in their conditions. Also, the chapter on steam engines would more properly find a place in a more extended work on prime motors, and there are a few slips when the author deals with other than purely electrical subjects. The fact is, the time has not yet come for anything more than a passing attempt to thoroughly classify the manifestations and the methods of control of electricity.

THE LENGTH OF THE THAMES. — The non-tidal part of the Thames is 138 miles in length and drains an area of 6,000 square miles. —*N. Y. Evening Post.*

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1 "*Building Construction and Superintendence.*" "*Masons' Work.*" Part I, 250 illustrations. By F. E. Kidder, C. E., Ph. D., Architect, author of "*The Architects' and Builders' Pocket-book.*" New York: William T. Comstock, 23 Warren St. 1896. Price, $4.

2 "*The Picture Gallery of Charles I.*" By Claude Phillips. London: Seeley & Co. New York: Macmillan & Co. 1896. Price, $1.25.

3 "*John La Farge, Artist and Writer.*" By Cecilia Waern. London: Seeley & Co. New York: Macmillan & Co. 1896. Price, $1.25.

4 "*Electric Lighting.*" A Practical Exposition of the Art for the Use of Engineers, Students and others interested in the Installation or Operation of Electrical Plants. Volume I. "The Generating Plant." By Francis B. Crocker, E. M., Ph. D., Professor of Electrical Engineering in Columbia University, New York; Vice-President of the American Institute of Electrical Engineers. New York: D. Van Nostrand Company. London: E. & F. N. Spon. 125 Strand. 1896. Price, $3.

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ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

CHÂTEAU DE BLOIS: RESTORED COURT-YARD FACADE. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE, LATE HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP.

[Issued with the International and Imperial Editions only.]

THIS and the drawing of the mantelpiece are published with the consent of the Trustees of the Rotch Travelling-scholarship. The fact that these drawings are rendered with a very delicate pencil line, which is complicated with an ink line in parts, has made it altogether impossible to secure really satisfactory reproductions.

CHÂTEAU DE BLOIS: DETAILS OF THE BALUSTRADE.

[Issued with the International and Imperial Editions only.]

CHÂTEAU DE BLOIS: SUNDRY DETAILS.

[Issued with the International and Imperial Editions only.]

CHÂTEAU DE BLOIS: COURT-YARD FACADE OF THE WING OF FRANCOIS I. AFTER THE DRAWING OF M. DUBAN.

SEE article elsewhere in this issue.

CHÂTEAU DE BLOIS: DOORWAY IN THE SALLE DES GARDES. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE, NEW YORK, N. Y.

CHÂTEAU DE BLOIS: TREATMENT OF BAYS ADJOINING THE GRAND STAIRCASE. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE.

CHÂTEAU DE BLOIS: TREATMENT OF BAYS TO THE RIGHT OF GRAND STAIRCASE. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXVII: TEMPLE OF FAUSTINA AND ANTONINUS, IN THE GARDENS OF THE VILLA BORGHESE, ROME.

A TALE OF CUBICAL CONTENTS.

SGRAFFITO DECORATION IN THE VICOLO CELLINI, ROME. ASCRIBED TO BENVENUTO CELLINI.

[Additional Illustrations in the International Edition.]

HOUSE OF HERR RICHARD FABER, 24 KLOPSTOCKSTRASSE, BERLIN, PRUSSIA. HERR E. SEIBERTZ, ARCHITECT.

[Gelatine Print.]

THIS building was erected in 1891–2 as a high-grade apartment-house. The street front exhibits a treatment of red and white brick with a parti-colored decoration of the rough-cast filling of plane surfaces. The site cost 160,000 marks and the building itself 317,619 marks, or about 340 marks per square metre.

SANTA MARIA DEI MIRACOLI, VENICE, ITALY. AFTER A DRAWING BY MR. G. O. TOTTEN, NEW YORK, N. Y.

[Copper-plate Photogravure.]

IN the Church of Santa Maria dei Miracoli we perceive very distinctly the influences exerted by the different styles which give it its peculiar charm. Its form is in general Gothic and Byzantine, while its details are of the Renaissance. One feels rather than discerns the Gothic influence, while as for traces of Byzantine architecture they are numberless. In plan, the building is unique and recalls the basilica: the nave of the church, long, simple and without transept, ends in a square apse. The rear end is higher than the front and here is placed the sanctuary in such a fashion as to shorten the rather too long nave and give to the sacristy the needed space to produce a good effect. The dome is of masonry, but the vaulting is of wood, which is magnificently decorated with paintings. The walls, lined with marble from Greece as well as Italy, are decorated with panels in a simple but very effective manner and the sculptured details are worthy of the most attentive study. M. Eugène Müntz has thus expressed himself on their merits: "These sculptures, undercut like works of jewelry, have as much grace as originality; they especially have a spontaneity, a freshness, a perfume of youth which make them the most spring-like and most exuberant of the stonecut poems of this most fortunate epoch." The floor of the sanctuary is laid in mosaic-work of the most sumptuous description: on a ground of white marble is detached a marquetry of porphyry and precious stones enframed in a border of black cement. The effect obtained contributes to the penetrating charm of this little interior, which is still further enhanced by the exquisite figures of a Boticelli. The exterior of the church responds to the interior in richness and beauty. Here again all is marble and incrustation, but let M. Müntz once more teach us how to value it: "The grand semicircular pediment of the façade, its three windows and its two discs constitute a single composition as happy as one could desire. The circular pediment declares the interior arrangement of the nave: taken in consideration with the dome, undoubtedly of Oriental origin and inspired by St. Mark's, it gives a decidedly Byzantine air to the church. The façade that seems irregular in elevation shows better in perspective. The coloring also adds to its merits. To day, after the restorations carried out in 1877 in an exquisite manner by Signor Paoletti, this church yields in interest only to St. Mark's."

SKETCHES AT AUGSBURG AND NUREMBERG.

THIS plate is copied from *Architektonische Rundschau.*

MONUMENTS AT NICE. M. J. LEBVRE, ARCHITECT, AND AT MENTON, M. VAUDREMER, ARCHITECT.

THESE illustrations are copied from *La Construction Moderne.*

CHÂTEAU DE BLOIS: MANTELPIECE IN THE SALLE DES GARDES. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE, LATE HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP.

CHÂTEAU DE BLOIS: TWO CHIMNEYS.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

"THE ACTION OF HEAT ON CONCRETE."

CHICAGO, ILL., August 18, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — As a matter of public interest to architects generally and the building trade, I trust you will find space for the following:

In your issue of the 11th of July you published a paper by Mr. B. S. Dobie, on "The Action of Heat on Cement," in which, after giving in more or less detail the result of some experiments with briquettes made of cement, and cement and sand, which were subsequently subjected to heat under varying conditions, the deduction was made that "a fire of ordinary intensity is sufficient to ruin completely a very large covering of concrete."

Several years ago, in mixing up briquettes of Portland cement for testing, it was discovered that by the use of a much less quantity of water than ordinarily used, a stronger briquette was made. From this one fact, which is incontrovertible — standing alone and unsupported by any other evidence, the deduction was erroneously made that in mixing concrete it was best to use a minimum quantity of water, and this error rapidly spread through the profession, so that the practice of dry-mixing became prevalent to a very large extent both among architects and engineers, to the great detriment of many large works and innumerable smaller ones. This error is now about exploded, but it has taken many years to accomplish this.

In an analogous manner, strikingly similar to the above, has Mr. Dobie jumped to the conclusion that because cement and cement-mortar give certain results when tested by fire, concrete must necessarily act in a like manner. Such deductions are of very doubtful value and should be deprecated.

Wherever a well-made Portland-cement concrete, after due seasoning, has been exposed to the fire-test, in comparison with stone, brick or hollow-tile work, it has, so far as I am aware, stood such test triumphantly. Not to speak of the results of the great Chicago fire or the German Government tests, etc., all of which are probably well known to your readers, I will give three cases that have come under my own observation where concrete has resisted fire successfully:

One of the buildings in the Government Arsenal at Benicia, California, which was, I believe, used partly as a storehouse and partly as a blacksmith-shop, was a large brick building with sandstone trimmings for the most part. The door-sills, however, were of granite and the window-caps of Portland-cement concrete. This building took fire some years ago and was completely burned out.

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On investigation, shortly after the fire, I found that the granite sills which from their situation were exposed to the minimum amount of heat, were spalled and broken into many pieces; that the window trimmings of sandstone were very badly injured and that even the brickwork in many places adjacent to the windows had scaled off, whereas the window caps of Portland cement concrete, although necessarily exposed, on account of their position, to a yet fiercer fire, were but very slightly injured.

Again, I manufacture a brick the binding ingredient of which is like that of Portland cement, namely, a hydrated crystalized silicate of lime. This brick, therefore, if Mr. Dobie's deduction is correct, should withstand fire badly, but on the contrary, it resists fire admirably. It has been repeatedly built up in the form of a dry arch with the ordinary brick of various quantities and, in company with them and some fire-brick, been heated red-hot and then cooled as quickly as possible by throwing large quantities of water upon the arch and fire. Under this test the burnt-clay bricks of all kinds, including the fire-brick, have invariably gone to pieces — some only spalling slightly, others breaking up altogether. Yet, strange to say, this Portland-cement brick has never been known to break or suffer, except that its surface softens a little, but subsequently becomes hard again.

Again, a month or two ago, Messrs. A. Monsted & Company, of Milwaukee, made some composite beams of twisted iron and concrete, the iron being made from a bar one inch square, whilst the concrete was only three inches thick. Thus on three sides the iron was only protected by about one inch of concrete, yet notwithstanding the large proportion of iron, these beams which were heated red-hot and then plunged into cold water did not in any case separate from the iron or crack. They softened somewhat, but after exposure to the atmosphere in an ordinary chamber, became hard again.

Mr. Dobie's experiments are undoubtedly valuable, but it is very unwise to condemn Portland-cement concrete on such grounds. Let him first learn from the trade how to make a fire-resisting concrete and then test *concrete*, not *cement*, or cement and sand, and his deductions will have more weight.

Yours truly, Ernest L. Ransome.

Notes and Clippings

Excavations at Jerusalem. — At the general meeting of the Palestine Exploration Fund this year, Lieutenant-Colonel Watson read the annual report, which stated that the excavations at Jerusalem, for which a firman was granted by the Porte, have been carried on by Dr. Bliss with success. An interesting rockscarp has been traced for some distance along the side of an old wall of the city, south of the present wall, and followed for over 1,000 feet. In this line of wall the remains of several ancient towers and a gateway were discovered, and no less than four sills of the ancient gateway belonging to four different periods, were found *in situ*, one above the other. Dr. Bliss wrote, saying that he knew of no more interesting example of a place where four distinct periods might be studied in the short perpendicular space of four feet. Subsequently, on following the wall toward Siloam, there was found, near the bottom of the hill, another gateway, also representing four distinct periods. A retaining-wall across the mouth of the Tyropean Valley was examined. It was still too early to know the full significance of these discoveries. Dr. Bliss, in a summary of the results of the excavations, stated that near Siloam, outside the city wall, interesting Roman baths were discovered. Their work, he added, had gone very smoothly. A buried wall was no respecter of persons, and ran through the lands of a Greek Patriarch, a Moslem Pasha, a Latin father, or a Siloam fellah, with all of whom the excavators must come to some understanding, financial or otherwise. But he was glad to say that this understanding had always been friendly. Unfortunately, most of their work had been covered up; a barley field had revealed its secrets, and once again was in superficial appearance a mere barley field. The excavations were not the only work which have been carried on at Jerusalem under the auspices of the Fund. The veteran explorer, Herr von Schick, has pursued investigations of a very interesting character within the city. His examination of mediæval churches and convents in Jerusalem, and of the quarter known as Bab Hytta, threw a flood of light on the condition of the Holy City during the period covered by the Crusaders' occupation of it. — *London Standard.*

The Schools of Athens. — Mr. Morley, in an interesting and suggestive speech at the recent meeting of subscribers to the British School at Athens, described himself as neither a scholar nor an archæologist. An archæologist he certainly is not, says the *London News*. But he is one of those who maintain the standard of classical knowledge in public life, and exemplify in their style the permanent influence of Greek literature upon the world. The schools at Athens are intended to supply the archæological evidence which has already produced so many fruitful discoveries, and added so much to our knowledge of ancient life. The contribution of the British Government to this object is not liberal. It is £400 a year, as compared with £3,000 from France and £2,000 from the United States. But we are not altogether disposed to blame the Government. The objects of the British School at Athens are excellent, and knowledge is valuable to the whole community, not merely to a few persons of superior culture. At the same time, the bearing of Hellenic studies upon the ordinary business of mankind does not impress itself, and cannot easily be impressed, upon tax-payers who have been debarred by circumstances from the pursuit of learning. On the other hand, there are rich people who thoroughly understand the nature of the work done at Athens, and who could keep the School out of difficulties with no inconvenience to themselves To them, or to some of them, Mr. Morley's speech should appeal. The lamented death of Professor Curtius gave Mr. Morley an opportunity of comparing him with the great English historians of Greece. There can be no higher praise, even for Curtius, than the acknowledgment that he ranks with Thirlwall and Grote. But it is true, as Mr. Morley says, that Curtius had a peculiar power of making antiquities vivid, and imaginative conceptions real. He was a great man, and he belonged to a nation where the government undertakes research Here we rely chiefly upon private munificence, and we seldom rely upon it in vain.

First Builder of the Vatican. — The present existence of this palace is principally due to Nicholas V, the builder pope, whose gigantic scheme would startle a modern architect. His plan was to build the church of St. Peter's as a starting-point, and then to construct one vast central "habitat" for the papal administration, covering the whole of what is called the Borgo, from the Castle of Sant' Angelo to the Cathedral. In ancient times a portico, or covered way supported on columns, led from the bridge to the church, and it was probably from this real structure that Nicholas began his imaginary one, only a small part of which was ever completed. That small portion alone comprises the basilica and the Vatican Palace, which together form by far the greatest continuous mass of buildings in the world. The Colosseum is 195 yards long by 156 broad, including the thickness of the walls St. Peter's Church alone is 205 yards long and 156 broad, so that the whole Colosseum would easily stand upon the ground-plan of the church, while the Vatican Palace is more than half as large again. Nicholas V died in 1455, and the oldest parts of the present Vatican Palace are not older than his reign. They are generally known as the Torre Borgia, from having been inhabited by Alexander VI, who died of poison in the third of the rooms now occupied by the library, counting from the library side. The windows of these rooms look upon the large square court of the Belvedere, and that part of the palace is not visible from without. Portions of the substructure of the earlier building were no doubt utilized by Nicholas, and the secret gallery which connects the Vatican with the Mausoleum of Hadrian is generally attributed to Pope John XXIII, who died in 1417; but, on the whole, it may be said that the Vatican Palace is originally a building of the period of the Renaissance, to which all successive popes have made additions. — *F. Marion Crawford, in the August Century.*

Painting Bronze Statues. — An interesting experiment is now being tried on the statue of James II which is the ornament of Whitehall Gardens. Workmen, having carefully cleaned the bronze, which was in a very filthy condition, are now apparently varnishing it, but are in reality painting it with a very thin solution of a certain chemical product, the use of which in such a connection is the invention of Prof. A. H. Church, F. R. S. We believe that one of the latest acts of Lord Leighton was recommending the Office of Works to apply to Professor Church for advice in this matter. The eminent chemist has for years past been experimenting on this mode of preserving the patina of bronze, but has never before had the opportunity of trying it on a public work. It is understood that, when perfectly dry, this delicate coating will take a high and durable polish; and, if so, the question of enabling bronze to endure the London smuts and dirt will perhaps be solved. The examination of the statue, a masterpiece from the hand of Grinling Gibbons, and certainly one of the most precious works of public art in England, led to the discovery of a large hole in the shoulder, in which rain-water was settling, and which was disintegrating the mass. This will be stopped up, and the roll in the monarch's hand, which was found to be merely painted wood, will be replaced by a rolled scroll of bronze. Unfortunately, when the work was cleaned last, some years ago, too great violence was employed, and the surface imperatively calls for treatment. If Professor Church's experiment is successful, it is to be hoped that the process will be applied to other statues in our streets. Much of the sculpture in London has far more artistic merit than its present dilapidated condition leads the hasty passer-by to suppose. — *Pall Mall Gazette.*

Lightning and Deforestation. — "As a rule," says the *Lancet*, "lightning-stroke is most common in the open air, generally under the tree to which the victim has resorted for shelter, and this circumstance, even where only severe injury has been sustained, makes death more likely, as the measures for relieving shock and restoring the vital energies cannot be put in practice till too late. But this year the majority of fatalities from lightning have occurred in dwelling-houses. There is no doubt that for this greater frequency of thunder storms, as for the more prolonged drought and such like meteorological visitations of latter years, the steady tree-felling, unbalanced by tree-planting, is directly responsible." This account is fully borne out by the reports which have from week to week appeared in *L'Elettricita*, that journal regularly giving a certain amount of space to the subject.

Trolley-wire Supports in Chemnitz. — Chemnitz, Saxony, has a trolley line without poles, the owners of houses on the streets through which the line was to pass without exception allowing the use of their houses free, rather than have the poles set in the walk. The trolley-wires are supported by cross wires held by projecting hooks firmly fastened into the houses on each side of the street, an ornamental rosette surrounding each hook so that the hooks are by no means unsightly. — *Providence Journal.*

The Prince of Orange's Empty Tomb at Padua. — Italians generally accomplish what they set about. When Prince Philibert of Orange's grave was found to be empty at Padua recently, they began to hunt for him, and have now presented to the Dutch authorities a small casket containing the Prince's ashes. It seems that his body was cremated in 1530, after the siege of Florence. — *The Collector.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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SEPTEMBER 5, 1896.

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IT is interesting to follow the progress of French jurisprudence in regard to labor unions, which have had a career closely resembling that of similar organizations in this country, beginning as associations for charitable purposes; adding gradually to their aims that of monopolizing employment for their members; then falling into the hands of schemers, who have used them for political purposes, and for the oppression of innocent people, until it has become necessary for the public authority to interfere, to reduce their activity to its legitimate sphere. Until 1884, the most important law relating to the subject of labor organizations was to be found in the Code Pénal. Articles 414 and 415 of this provided that any infringement of the freedom of labor, on the part of either masters or men, by violence, threats or fraud, should be punished as a misdemeanor; and Article 416 added that similar penalties should attach to such infringement "through fines, prohibitions, proscriptions, or interdictions pronounced in pursuance of a concerted plan." It is evident that a law of this kind applies directly to the sort of discipline maintained by labor unions, which, by means of fines, prohibitions and interdictions, certainly interfere with the freedom of industry; and, in March, 1884, a law was passed, abrogating entirely Article 416 of the Code Pénal, and providing a set of rules for the establishment and regulation of industrial associations, both of masters and men. Under these rules, it is permissible for organizations, either of masters or men, to concert strikes or lockouts, and to discipline their members by fines or interdicts, so long as they employ peaceful means, Articles 414 and 415 of the Code Pénal, which are directed against disorder, violence and fraud, remaining in full force. Although strikes or lockouts undoubtedly interfere with the freedom of industry, the present view of the law is that they are normal phenomena of industrial economics, not involving either criminal or civil liability. In a case decided in 1885, by the Civil Tribunal of Lyons, it was shown that an association of manufacturers had expelled a member, and had made public announcement of the fact by advertisements in the newspapers, and by posting hand-bills in the town. The expelled manufacturer sued the association for damages, but was defeated; the Court holding that the law of 1884 gave to such associations the right, not only to use means of discipline, but to make publication of its judgments; and that, whatever might be the consequence to individuals of the exercise of this right, the persons exercising it could not be held liable for damages, unless violence, threats or fraud, such as would bring the case under Articles 414 or 415 of the Code Pénal, had been employed.

WHERE, however, an industrial association undertakes to apply discipline to persons not subject to its rules, the case is quite different. Article 7 of the law of 1884 provides that "Any member of a professional syndicate may withdraw at any moment from the association, notwithstanding any contrary clause" in the rules of the association; and the attempt to coerce any person into joining such an association is a plain violation of one of the most important clauses in the statute through which such organizations hold their legal rights. In January, 1888, a workman, named Joost, became a member of a calico-printers' union at Bourgoin. A year later, he stopped paying his monthly dues, and considered himself as having resigned. The union warned him, but he refused to resume his membership. A few months later, a formal report was made to the union that Joost had refused to "submit," and it was voted to expel him, the members voting at the same time not to work in the same shop with him. Notice of this vote was given to his employer, M. Brunet-Lecomte, and, rather than risk a strike, the latter discharged Joost, expressing to him his regret at being compelled to do so. Joost then made application to several other houses, but notice had been circulated that his name was on the black-list of the union, and all refused to employ him. He then applied to the Courts for relief, and, after two decisions against him, the highest Court of appeal decided in his favor, awarding him damages against the union, to the amount of ten thousand francs. In its decision, the Court pointed out that the law of 1884 gave every member of a union the absolute right to withdraw from it whenever he pleased; and said that, while concerted threats of a strike were permitted by the statute when they were intended to defend the professional interests of the union, they were not authorized as a means of compelling a master to discharge a workman because of his withdrawal from the union, or refusal to enter it. "In this case," said the Court, "there is an infringement of the rights of others which, if the threats are effectual, renders the union liable in damages to the discharged workman." Another appealed case of a similar sort has been decided in the same way, so that it is now settled law in France that unions cannot compel the discharge of non-union workmen, by threats of a strike, without rendering themselves liable in damages to the man discharged.

THE Government of Roumania has recently undertaken some important archæological investigations, under the care of Professor Tocilescu, of the University of Bucharest, Chief Director of the National Museum, who has already obtained valuable results. The great plain of the Dobrudsha, at the mouth of the Danube, was, during the Imperial period of Rome, and even earlier, the scene of constant struggles between Romans, Greeks and barbarians, and, by the more energetic of the Emperors of the West, was fortified and colonized as a permanent outpost. The chief garrison of the triple line of fortifications which extended across the plain was, after the fall of the Claudian Emperors, the town of Tropæum Trajani, which rose to the rank of a Roman municipium, and was adorned by Trajan with a splendid monument, erected in honor of his victory over the Dacians, from the designs of Apollodorus of Damascus. Long afterwards, the city was destroyed by the Goths, but was rebuilt by Constantine after he had driven the barbarians from the province. At present, the ancient city of Tropæum Trajani is represented by a mound of débris, some ten miles south of Rasova, which is known locally under the name of Adamklissi. On this spot Professor Tocilescu, after careful examination of the topography of the country, and of the existing remains of the triple line of fortification, decided to begin his researches; and he was rewarded by the discovery of one of the most complete Roman towns known. The little city covers an area of about twenty-six acres, and is surrounded by walls, which are strengthened by thirty-six towers, of which twelve have already been uncovered. The two main gates of the city are at the east and west, and between them runs the principal street, which is paved with stone slabs, and furnished with channels through the middle, after the manner of some of the Swiss towns, for conveying water. On this street are the remains of a Roman basilica, or court-house, and of a Byzantine church, with a mosaic floor. The monument erected by Trajan is still in place, as is also a mausoleum, built by Trajan in memory

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of the soldiers who fell in the great battle fought near the place, and covered with inscriptions. What will be found in the humbler buildings of the town it is impossible to say, but Professor Tocilescu thinks that it bids fair to turn out almost a second Pompeii in interest.

IT is curious that some of the most important discoveries of Roman antiquities have been made far from Rome. During the Imperial period, particularly the latter part of it, the inhabitants of the great provincial cities vied in luxury with those of the capital itself, and, although they were earlier exposed to the attacks of barbarians, they were not, as a rule, so systematically and continually plundered as Rome, which, it must be remembered, was at one period left without a single living inhabitant. The consequence is that, although Rome still furnishes traces of its imperial magnificence and wealth, the barbarians have taken good care to leave none of the manifestations of that wealth which they found portable enough to carry away. In the provinces, the case is different. It is well known that the Roman generals took with them on their marches, an immense array of furniture, silverware and so on, so that they might feel at home wherever they went. Even Julius Cæsar, who was as eager a campaigner as any of them, and noted for the rapidity of his marches, is said to have had a mosaic pavement carried about with him, and laid in his tent at every halt; and such an event as the defeat of a legion, or the capture of a Roman general, usually involved the distribution of a large amount of personal property among the victors. It will be remembered that an immense deposit of antique silverware was dug up several years ago in Germany, which was supposed to have been the camp outfit of a Roman officer, buried in order to keep it from the hands of the enemy on the occasion of a hasty march; and some of the barbarian generals brought vast spoils, collected from the plundered Italian cities, through Mœsia and Dacia on their way to their homes. To this day the peasants of the Danube provinces retain a memory of Attila, who, according to the legend, ordered that the enormous treasures which he had brought with him from Italy should be buried with him, by the hands of slaves, in some spot to be selected by them, and revealed to no one else, and that the slaves, on their return from their mission, should be put to death, so that the place of his sepulture should never be known. Many attempts have been made to find the treasure of Attila, but without success, except that some gold and silver cups found a few years ago in a lonely spot were conjectured to have formed a part of it; and it is quite possible that the Roumanian mounds may prove mines of archæological wealth.

AS every one knows, American students in search of instruction more specialized than is afforded in this country, almost always go to the German universities for it. Occasionally, an American is found who has taken a degree at Oxford or Cambridge, or has followed courses at a French university, but these are rare exceptions, while hundreds of our educated men hold degrees from German universities. The reason of this is not to be looked for, perhaps, in the superiority of the German universities, so much as in the restrictions which have hitherto been imposed upon foreign students in France. To many Americans, the French methods of teaching are more congenial than those of Germany, while many more speak French easily, but not German. For these reasons, a strong effort has recently been made by friends of education in this country to have admission to the French universities made easier for Americans, and the French authorities have responded to the appeal with great courtesy, and have already made some important concessions. The authority granted by the universities to practise a profession in France is still, as it has been for many years, reserved to French citizens, but degrees are now open to Americans, and the opportunities for study are the same for all students.

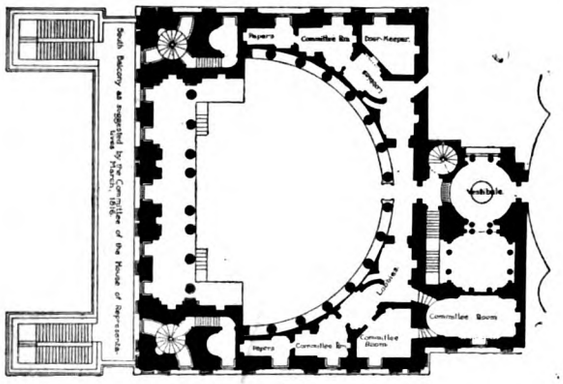
IT is said that a steel tower, eleven hundred and fifty feet high, is already in process of construction in Chicago. The plan of the structure, which is intended as a speculation, and is to be occupied by restaurants, barbers' shops, dance-halls, a bicycle-rink, a theatre, and so on, closely resembles that of the Eiffel Tower in Paris. The base occupies an area about three hundred and twenty-five feet square, with four arches two hundred feet in span, and two hundred feet high. Above the arches is a platform, with an open floor area of ninety thousand square feet, which will accommodate an assemblage of twenty-two thousand persons. The next landing is four hundred and fifty feet above the ground, and is one hundred and fifty feet square. Above this is a succession of landings, of course diminishing in size to the top platform, which is twenty-five feet square. Thirty-four elevators are to convey passengers to various parts of the building, while stairs are provided for those who prefer to use their own muscles to transport them. Steel construction is very cheap now, and it is expected that the tower can be completed for about eight hundred thousand dollars, while the Eiffel Tower, which is not so high, cost twelve hundred thousand. According to the New York papers, the structure has already been leased for ten years to a syndicate of New York and Chicago capitalists, and is to be ready for use by next summer.

SOME interesting archæological discoveries have been reported this week. At Mycenæ, a vaulted chamber, similar to the so-called Treasury of Atreus, the Treasury of Orchomenos, and other structures, which are now known to be tombs. The wonderful discoveries which Schliemann made in these tombs, in which, as he thought, he found the remains of Agamemnon, will be remembered; and the present one has the advantage over nearly all the others known of being practically intact, the fall of a huge mass of earth, in early times, having protected it from spoliation. The removal of the earth will be difficult, but the labor will, apparently, be well repaid. At Babylon, Professor Hilprecht, who is in charge of the explorations being made for the University of Pennsylvania, has discovered objects of far greater antiquity than any yet found in the Euphrates valley. Until within a few years, the cones of baked clay, with inscriptions in cuneiform writing marked spirally around them, which have been found in great numbers in certain underground chambers in Mesopotamia, and some of which are proved to have been made four or five thousand years before the Christian era, have been regarded as the oldest known works of human hands. Recently, however, inscriptions have been found, at least twenty-five hundred years older; and Professor Hilprecht has now added to these some antiquities which cannot be of more recent date than 9,000 B. C. It is found that the site of Babylon, like that of Troy, presents a series of superposed strata of remains and débris, differing in character from one another, as the place was occupied by successive races of conquerors or colonists. Even now, the excavations have not reached the virgin soil, and Professor Hilprecht is confident that objects will be found which can be assigned at least to the one-hundredth century B. C. It is with difficulty that we can conceive such antiquity. The interval between the year 10,000 B. C., remains of which Professor Hilprecht thinks he is bringing to light, and the Trojan War, is very nearly three times as great as the interval between the date of the Trojan War and our own time. To put it in another way, the entire history of the Roman commonwealth, from the turning of the first sod by Romulus on the Capitoline Hill to the surrender of the last of the Roman Emperors to the barbarians, might be ten times repeated in the interval between that remote age and our own day. It is impossible not to wonder what manner of people they were who bought and sold, and made records of their contracts, in the valleys of the Tigris and Euphrates twelve thousand years ago. We know something of the Egyptians of the age anterior to the building of the Pyramids. We know that they disliked to think of wars and conquests; that they decorated the walls of their buildings with pictures of innocent festivity; and that the beautiful statues which they made represented their subjects with a placid smile; but whether the Mesopotamians whose work Professor Hilprecht is examining, and whose age was more remote from that of the Egyptian tomb-builders than ours is, were of like peaceful mind, or not, no one can yet say.

MAYOR WARWICK, of Philadelphia, is evidently a believer in the divine right of municipalities to get their supplies, cheap if not good, from the lowest bidder. He recently declined to approve the contract for shelving in the law library of the City-hall, on the ground that the device called for by the architect — who had, in fulfilment of his duty to provide a suitable fixture, examined libraries in Boston, Washington and Harrisburg — was protected by patent! Seemingly, the mayor feels that an architect's specification should always include a clause declaring that "any old thing will do."

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HISTORY OF THE UNITED STATES CAPITOL.[1]—VI.



Plan of the Principal Floor of the South Wing of the CAPITOL as authorized to be built, 1850.

Fig. 33. Latrobe's Plan of House of Representatives after the Fire.

AFTER the fire it was doubtful for some time whether the Federal buildings would be repaired or removed to some other site or city. Many Congressmen thought this a favorable time to remove the seat of Government to some city in which they and their constituents were personally interested. Others proposed a change of site in Washington for both the Capitol and the President's House. A committee was appointed by Congress to consider these questions and on November 21, 1814, this committee reported in favor of repairing the old buildings, because it would be cheaper, while to remove them would be an injustice to the property-owners who had bought lots in the vicinity of these buildings with the idea of their being permanently located.

February 15, 1815, Congress authorized the President (Madison) to borrow five hundred thousand dollars to rebuild the public buildings. On the same date Madison appointed three Commissioners, John P. Van Ness, T. Ringgold and Richard B'and Lee, at a salary of $1,600 each, to superintend their restoration.

March 14, 1815, B. H. Latrobe was requested to call on the new Commissioners in reference to retaining the place as principal

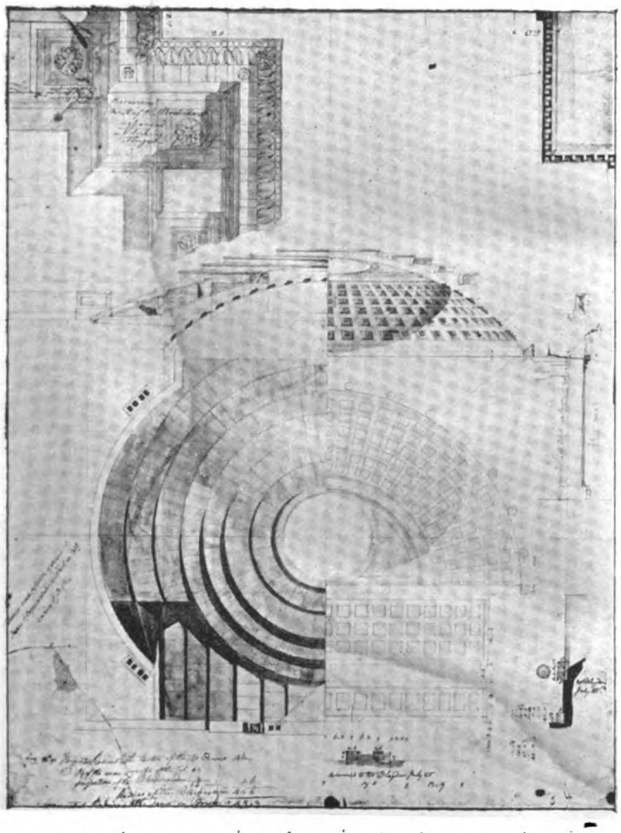


Fig. 34. Latrobe's Drawing for Masonry Vault over House of Representatives (not executed).

architectural adviser, which he held when the work stopped in 1811.

When the work ceased on the Capitol Latrobe went to Pittsburgh, where he was engaged in introducing steamboats on western rivers, and it is a little strange that Thornton had entered into the same enterprise as early as 1789, when steamboats were not in a sufficiently advanced state for him to make it successful.

Latrobe's private enterprises, however, prevented his going to Washington to answer the summons of the Commissioners as quickly

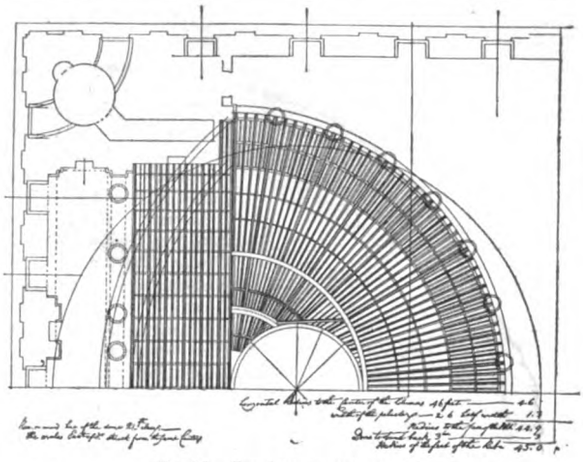


Fig. 35. Framing-plan as executed.

as they thought he should, and on March 31st they wrote a strong protest against further delay.

Latrobe arrived in Washington April 20, 1815, and was appointed to undertake the repairs of the Capitol.

On May 16th, the Commissioners wrote to President Madison: "We have employed Mr. Latrobe as architect or surveyor of the Capitol." In the same letter they state that Latrobe had made a preliminary report on the Capitol and thought the south wing could be completed before 1816. This letter contains the first suggestion for changing the form of the House of Representatives. A semicircular room with a segment slightly greater than a semicircle, with committee rooms beneath the galleries, was recommended by the Commissioners, and plans on that form were submitted to President Madison for his approval. (Figs. 33 to 37.)

After a preliminary investigation Latrobe returned to Pittsburgh

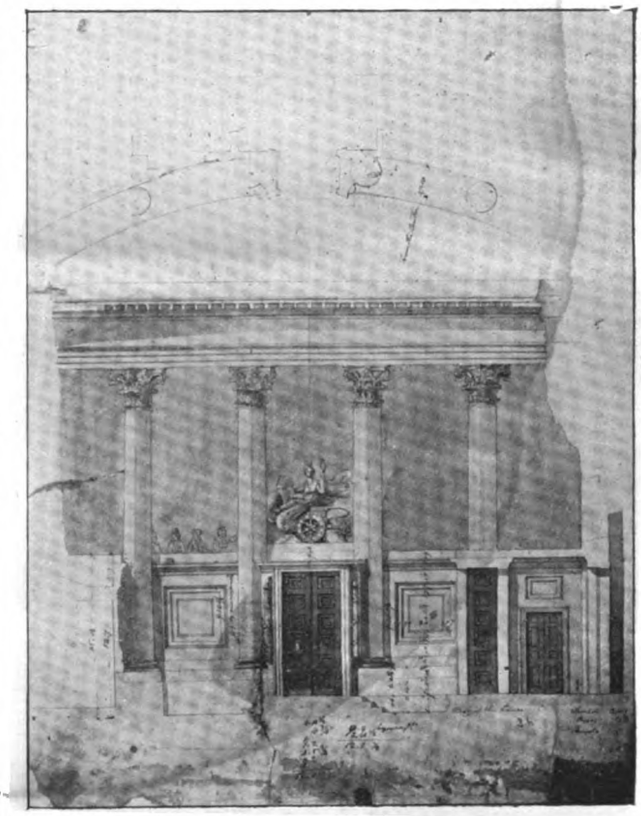


Fig. 36. Latrobe's Elevation of House of Representatives.

for six weeks, so as to settle his private enterprises and to bring his family to Washington.

June 29, 1815, Latrobe was requested by the Committee in charge to furnish Congress with an accurate statement concerning the labor and materials needed to finish the House of Representatives by December, 1816. This and other Committees were doomed to much

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disappointment, as this portion of the building was not finished for many years.

August 8, 1815, Andrei was sent to Italy with orders to purchase twenty-four Corinthian capitals for the House of Representatives, and four Ionic capitals for columns, with two pilaster capitals for the Senate Chamber, for all of which Latrobe furnished the necessary drawings. These capitals were all to be of the best statuary marble. Andrei was promised an increase in his salary to $1,500 per annum when he returned to the United States. He was also authorized to engage a sculptor who was proficient in making or modelling figures, and to make arrangements to bring over the sculptor's family. It was about this period (August 26, 1815), that the first mention is made of the columns used in the present Statuary Hall. It was suggested that variegated marble from Frederick County, Maryland, should be used.

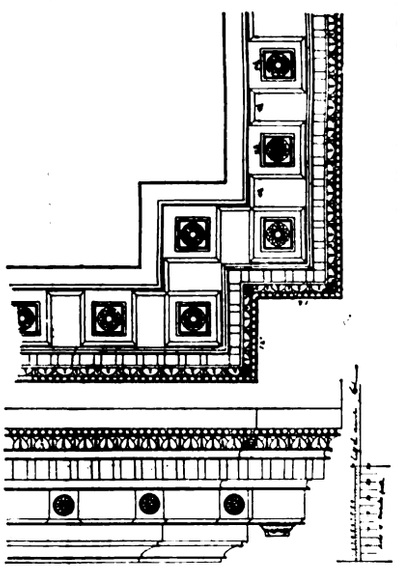


Fig. 37. Detail of Cornice.

December, 1815, Latrobe made a plat for the grounds surrounding the Capitol, introducing the landscape effects which he thought desirable in the grounds, and his disposition of the Tiber Creek and the Canal, both of which ran near the Capitol. (Fig. 45.)

In the latter part of December, 1815, Latrobe made a request for an architectural assistant to be paid by the Government. December 29th, the Commissioners replied: "It never having been mentioned or even alluded to in the interviews we have had with you, we fairly assumed that it was not anticipated," and consequently they declined to appoint an assistant but increased Latrobe's salary $500, making it $2,500 per annum.

From November, 1815, until Latrobe severed his connection with the Capitol the records show many protests from the Commissioners against the slow progress of the work and against his giving too much attention to private matters, for Latrobe had many private interests and enterprises which he was endeavoring to manage contemporaneously with his work on the Capitol. Both he and the Commissioners were fretting, he, because he felt under too much restraint, and they, because he gave, according to their ideas, too little time and attention to the public work.

One of the principal causes of delay was the difficulty in obtaining the marble columns from the Potomac, and Latrobe suggested that they should use sandstone in its place. In a letter of February 26, 1816, the Commissioners objected to this change.

Latrobe's plans for the reconstruction of the House wing made at this period are in the possession of the Congressional Library, a selection from which are shown in Figures 33 to 37. The drawings show a complete change in the interior of this wing of the Capitol. Figure 34 shows Latrobe's idea of a masonry vault, the erection of which Madison overruled. Figure 35 shows a framing-plan of the roof as it was finally constructed.

Judging from the plan, elevation (Fig. 36) and details (Fig. 37), this wing was completed strictly according to Latrobe's drawings.

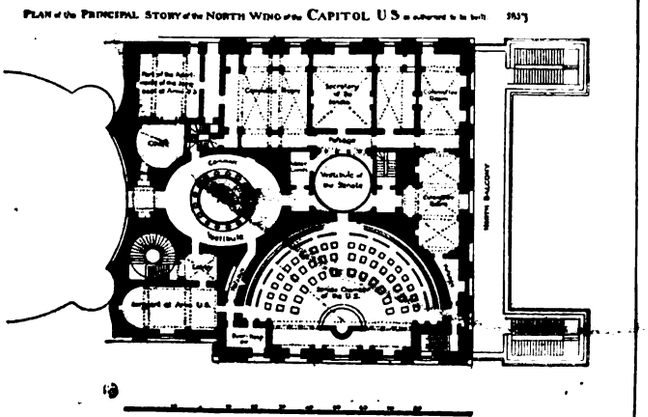


Fig. 38. Latrobe's Plan for Reconstruction of Senate Wing.

April 24, 1816, Congress abolished the commission of three who had been put in charge of Government buildings and authorized the appointment of a single commissioner at a salary of $2,000 per annum, Samuel Lane, of Virginia, being appointed to fill this position. Congress by the same act gave President Madison power to make any changes that he might think proper in the plans of the Government buildings.

At this period Hoban, in charge of the President's House, and Latrobe, in charge of the Capitol, were requested to give their opinion as to the best material for covering the public buildings. Latrobe named, placing them in the order he considered most meritorious, marble, freestone, zinc, iron, copper. Hoban placed copper first. Madison agreed with Hoban and copper was selected as the covering.

The north wing was more damaged by fire than the south, the

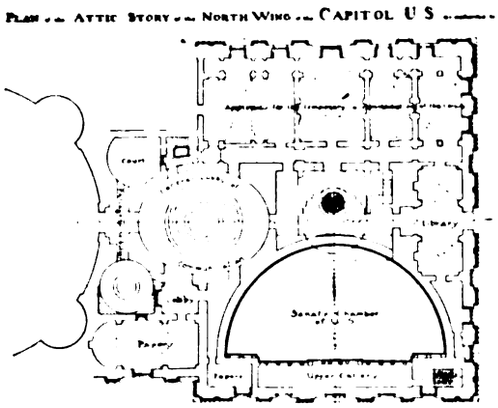


Fig. 39. Attic Story, Senate Wing.

whole interior of the west side of the north wing having been constructed of timber, and the old shingle roof remained over the greater part of the wing. The columns in the Senate Chamber were burned to lime and everything of freestone was cracked, but the brick dome of the Senate Chamber was entire.

Latrobe's report to Congress, November, 1816, gives a clear idea of the state of the building at this period. In the south wing no progress had been made on the interior, because of the difficulty in getting stone, but externally all damage done by the fire had been repaired.

Just before retiring, the three Commissioners adopted alterations suggested by Mr. Latrobe in the north wing. One of the alterations consisted in the enlargement of the Senate wing so it would encroach upon the central space. It will be remembered this was one of Latrobe's suggestions against which Thornton protested early in 1800. August 22, 1816, President James Madison recorded his objection to this part of the alteration.

The Senate and President finally agreed upon an enlargement of the Senate Chamber itself without enlarging the wing so as to interfere with the central space.

September 19, 1816, Samuel Lane, the Commissioner of Public Buildings, directed Latrobe to proceed with an enlargement of the Senate Chamber. It will be remembered that this was a point Thornton advocated with persistence at the beginning of the work.

Latrobe says in report, 1816: "In pursuance of the order, it was necessary to take down the vaults which had been constructed on the west of the house and raise them to the principal floor. . . . The ruinous state of the building further required that the dome of the centre vestibule, the colonnade and all the vaulting of the Court-room, and the dome of the great stairs with all the walls as far as they were injured should be taken down. The enlargement of the Senate Chamber required the great dome of the apartment and its semicircular wall to be entirely removed, and the arches and walls of

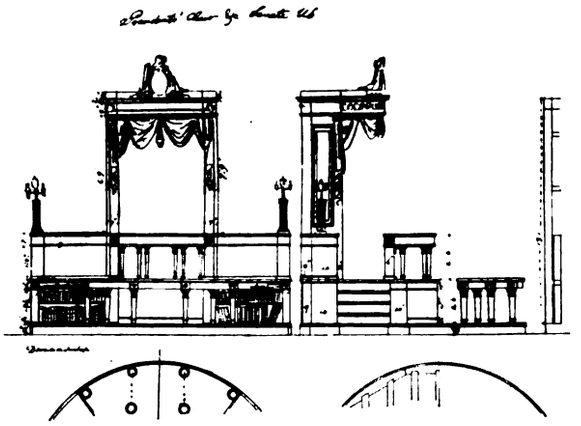


Fig. 40. President's Chair, Senate.

the two committee-rooms and the lobby adjoining the Chamber could also be demolished."

Madison took an active interest in the construction of the Capitol and did not hesitate to express his opinion on matters of design and

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construction. August 29th he objected to Mr. Latrobe's idea of a brick dome over the Senate Chamber, because the former arch had pressed out the walls three and one-half inches. Madison was justified in such opposition by the trouble Latrobe had previously had with similar, but much smaller, arches. Mr. George Blagden also felt certain that the walls would not hold such an arch.

All interior work in Senate wing (except roof and ceiling of Senate Chamber) was replaced by solid masonry.

Latrobe's drawing for the north wing (Figs. 38 to 43) show that the interior of the wing of the building was reconstructed from them on the lines of Thornton's original plan. The plans (Figs. 38 and 39) show this portion of the building as it stands to-day with very slight alteration.

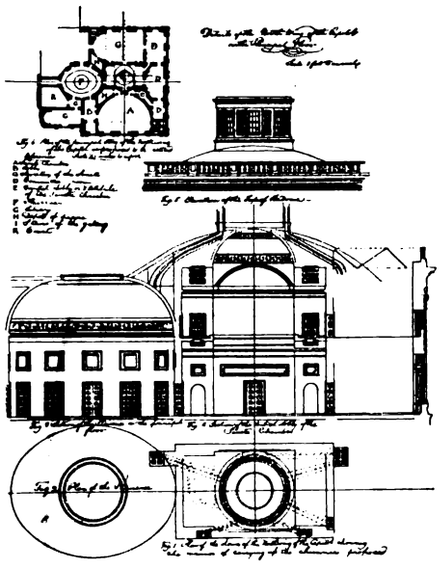


Fig. 41. Plans and Section showing Vaults and Chimneys, Senate Wing.

Figure 41 is an interesting drawing, illustrating Latrobe's method of carrying the chimneys to the highest point of the roof, at the same time concealing them from view in the cupola which he introduced at this time over each wing. It also shows the arch which gave way, and over which he and Bulfinch had a controversy at a later date.

Figure 42 is a section through light-shaft where Thornton intended to place the principal staircase in the hall of the Senate wing. It is in these columns that Latrobe introduced his tobacco-plant capitals (Fig. 43).

In a letter, February 16, 1817, explaining the reasons for delay on the work and the increased cost of the undertaking, Latrobe describes the following alterations: "Very extensive improvements of Senate Chamber were suggested by the Senate and ordered carried out by the President [Madison].

"To carry out the order it was necessary to take down not only work which had been constructed the preceding season, but the enlargement of the Senate Chamber required that the great dome of that apartment and its semicircular wall should be taken down, and that the arches and walls of the committee-rooms and the lobby adjoining the Chamber should be entirely abolished and much additional strength and solidity given to the whole structure. This produced the loss of one season's work on the north wing and took another season in undoing what had already been done."

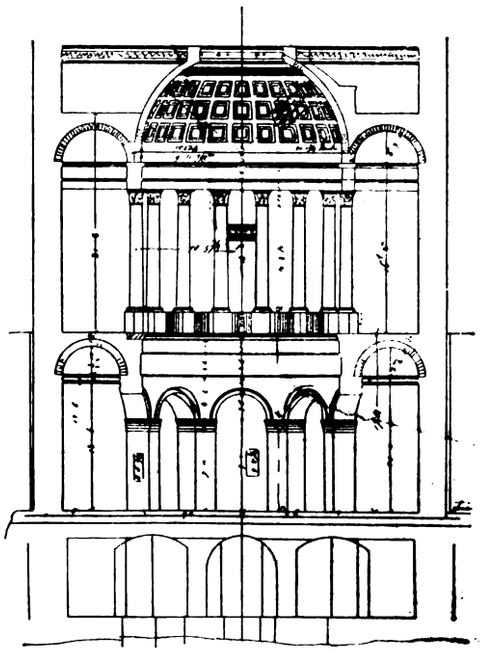


Fig. 42. Light-shaft in Senate-wing Hall.

The Capitol had been heated by stoves and furnaces. There are several letters inquiring into the merits of different kinds of stoves.

It was April 2, 1817, before the order was issued that the domes over both the House of Representatives and the Senate Chamber of the Capitol should be of wood.

April 5th President Madison authorized the employment of two skilled draughtsmen to assist Latrobe, with the hope that in this way the work would progress more rapidly.

During the spring and summer the work progressed slowly, according to the opinion of Congress and others interested. From early in April until the fall Latrobe made a weekly report to President Madison, showing the number of men at work at the end of each week. The number employed varied from ninety to a hundred.

The columns of Brescia in the House of Representatives, now Statuary Hall, seem to have given Latrobe considerable trouble, because of the difficulty he found in getting them quarried and cut.

September 24, 1817, the north wing was still without its roof-covering. The entablature was not complete for the House of Representatives, the columns in the Senate were not up and the doors and woodwork were still unordered.

Samuel Lane, on October 31, 1817, made Captain Peter Lenox Clerk-of-works at the Capitol. Lenox was transferred from a similar position at the President's House, and Charles Davis, who occupied the position at this time on the Capitol, was sent to the President's House.

Latrobe in a letter to Lenthal, 1806, stated that Thomas Jefferson favored Lenox's appointment to this position in 1803, but allowed Latrobe to make his own selection at that time.

Latrobe protested against removal of Davis, but Commissioner Lane insisted, as he thought for the sake of expediency and economy the change was necessary. He accuses Latrobe of often recommending men in every way unsuitable for the work and he transferred Captain Lenox "from a conviction of his abilities in every branch of the business which he would have to perform and the proof he has lately furnished of activity and success in the prosecution of the work at the President's House.

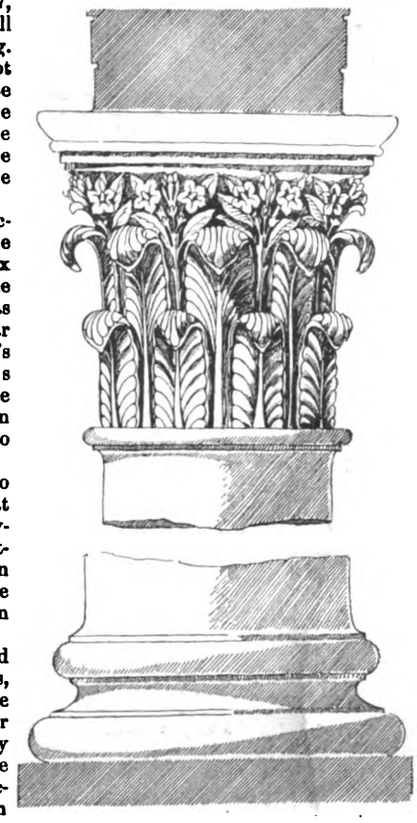


Fig. 43. Tobacco-plant Capital.

"My anxious desire is to accelerate, not retard the work at the Capitol; knowing my duties I shall scrupulously perform them. All I wish of you is attention to your own."

The appointment of Peter Lenox against the protest of Latrobe was the cause of Latrobe's sending in his resignation to President Madison, who does not seem to have raised any objection to this action, but referred it to the Commissioner through whom it should have come.



Fig. 44. Detail of West Front as proposed by Latrobe (not executed).

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The Commissioner answered as follows:

November 24, 1817.

B. H. Latrobe.

Sir, — Having seen your letter to the President of the United States, resigning the appointment of architect of the Capitol, I have to inform you

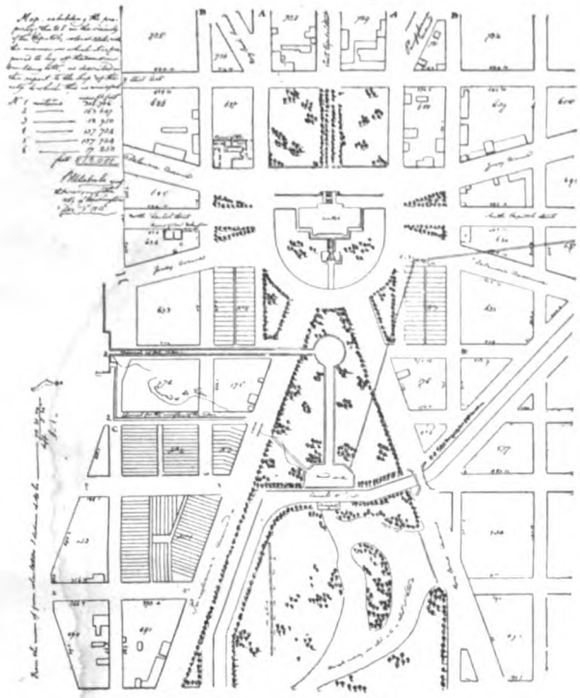


Fig. 45. Map of Grounds and City Surrounding Capitol, made by Latrobe.

that your resignation is accepted and to request that you will deliver to Captain Lenox all the books, plans, instruments, etc., belonging to the public in your possession. Yours, Samuel Lane,
Commissioner of Public Buildings.

Latrobe had nothing further to do with the supervision of the Capitol, although the larger portion of his designs in reference to interior work seems to have been carried out with little change.

Latrobe left his personal impress on the work as a designer as well as a superintendent. He made the original design for the reconstruction of the interior of the south wing or old Hall of Representatives. His modification of the north wing was so slight that Dr.

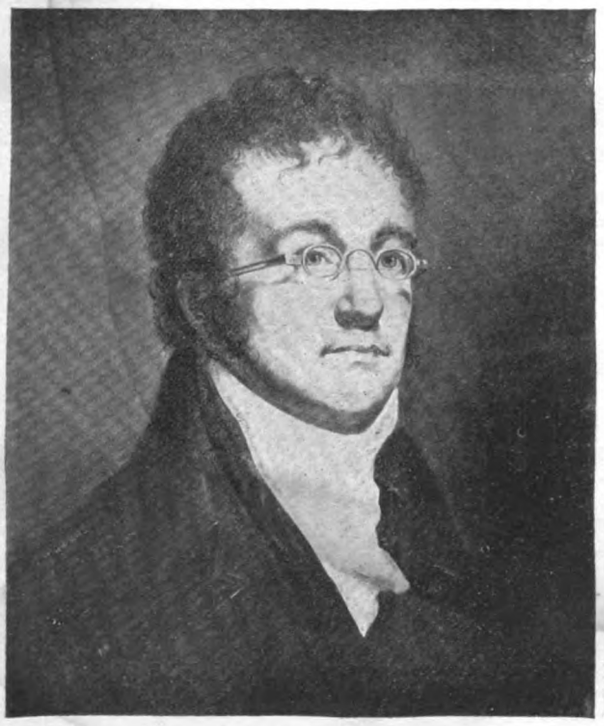


Fig. 46. Benjamin H. Latrobe.

Thornton's scheme, with the exception of details, remained as it was. He changed the western front of the central building (Fig. 44), and modified the portico on the east, as I have previously mentioned (Fig. 29 *a*). He added the domical roof with cupolas over each wing.

A portrait[1] in the Capitol (Fig. 46) shows Latrobe as a man of striking personal appearance. Glenn Brown.

(To be continued.)

OLD LOMBARD AND VENETIAN VILLAS.[2] — II.

Bergamo, September 28th. — We have been to-day to see the home of the other dead Bergamask worthy (it is curious that worthies should always be dead), Malpága, the Castle of Bartolomeo Colleoni. We are all of us familiar with Colleoni's person; Verocchio represented him in that statue — equal almost to the antique Marcus Aurelius — which stands in Venice before the Church of SS. John and Paul. There he rides with eagle face beneath his helmet, making one mumble Dante's verse —

"*Cesare armato dall' occhio grifagno,*"

his iron-cased legs stiff-stretched, his gauntleted bridle-wrist bent, his corseleted strong body straight in the high pommels, the great charger stepping boldly out, riding with dauntless ease, it would seem, into eternity. As a matter of fact, however, he did the latter so very little that it is not easy to say, without consulting detailed histories of fifteenth-century warfare, where Colleoni *did* ride to. He seems never to have gained a famous battle or been engaged in an historic siege; he did not found dynasties or tyrannies like Francesco Sforza or Braccio; he never won the love of a queen-like Altendolo, nor was entrapped to death like Carmagnola. His fame is due, most likely, to great science in military things, and to the acquisition of great wealth. Besides, he was careful to erect monuments to his own glory; the elaborately carved chapel — a wonderful Renaissance toy — in Bergamo Cathedral, the frescos, now destroyed, in his former house in the upper town, are all self-glorification; I am not sure whether the statue at Venice was not erected with his own moneys. The political men of the fifteenth century were a terribly vulgar lot; their crimes, which English writers have tried to make romantic, ever since Tourneur, Massinger and Marston, were those of common felons and maniacs; their attitude towards the world, towards posterity, grotesque; lasting influence not one of them ever had over the institutions of his petty State. The true genius of those days was in the artists, who spoke for and through the people, and were *not* monsters of romance. And, but for the art, but for the sculptors of Rimini, but for the architects and painters of Urbino, the Bramantes and Luinis and Leonardos, what should we care nowadays for those despots, or would-be despots — Malatestas, Montefeltros, nay, even Sforzas? and, above all, of this glorious Colleoni, what would remain, save for that chapel of his, those frescos of Malpága, that lovely tomb of his little daughter; above all, that statue in Venice?

I made these reflections, which any one may contradict or amplify, this afternoon before the frescos in the Castle of Malpága. They represent the various glories of Colleoni's career. He enters Brescia surrounded by his captains; he presides over a splendid tournament; he sets out for the chase; he distributes splendid liveries to his followers; he receives kings and queens in his castle; he sits, finally, feasting at his own table, among gallant, bearded, Venetian nobles, and brocaded, splendid women, a sort of romance of chivalry, made some fifty years later out of the not over-chivalric details of a mercenary captain's life. But at Malpága, the sword — that long sword stiff upon the *condottiere's* hip — has most emphatically been ground down to a sickle. The frescoed rooms are filled with frames, mats and all the apparatus for the rearing and despoiling of silkworms. The great hall is given over to the selecting and packing of the silkworm seed. Heaps of plucked maize ears litter the escutcheoned castle-yard, and the landings of the great staircase. Immense pumpkins — green, not yellow — lie between the pillars of the delicate belvedere loggias; the circle of long, low buildings, once the barracks of the condottiere's parti-colored troopers, are turned

[1] *Benjamin Henry Latrobe*:—Many of the facts of the following sketch are taken from a short Life of Latrobe by his son, J. H. B. Latrobe. John Henry Boneval de La Trobe, who was in the military service of the Prince of Orange, went with the Prince to England. Settled in Waterford. His son, Benjamin La Trobe, married Anna M. Ates, a Pennsylvanian Moravian, who was studying in England. Benjamin was one of three sons of this union. He was born May 1, 1764, in Yorkshire, England. Educated in England and the University of Leipsic, which he left in 1785. He studied architecture under Mr. Cockerill from 1786 to 1788, when he started in business for himself, becoming in 1789 "Surveyor of the Public Offices and Architect and Engineer of the City of London." 1790 he married Miss Lydia Sellon. 1793, on the death of his wife, he came to this country, influenced by a love of adventure and the democratic institutions of the country. He landed in Norfolk, Virginia, March 20, 1796.

From his arrival in this country until his death he was actively engaged in architectural and engineering work. Among other pieces he did may be mentioned the Penitentiary in Richmond, Va., the Centre House in Philadelphia, the Bank of Pennsylvania, St. John's Church, Washington, Catholic Cathedral, Baltimore. He was a linguist, speaking and writing several languages — a clear and forcible writer.

In 1800 he married the only daughter of Isaac Hazlehurst.

His long connection with the Capitol, eleven years, is described in the foregoing pages.

As engineer he constructed the original Chesapeake and Delaware Canal; helped to put steamboats on western rivers. He was engaged in erecting works for supplying the City of New Orleans with water when he died, September 3, 1820.

For further particulars in reference to Latrobe, see paper of J. H. B. Latrobe, American Institute of Architects; Convention 1880, Architectural Publication Societies' "*Dictionary of Architecture*." London. 1852-93, and the "*Lives of Eminent Philadelphians*." 1852, by Henry Simpson.

Wm. Strickland and Robert Mills worked on the Capitol as draughtsmen for Latrobe.

[2] An article by Vernon Lee in *Cosmopolis*. Continued from No. 1071, page 7.

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into peasants' houses and barns and granaries. The moat, over which still creaks the wooden drawbridge, has become a vineyard and mulberry orchard; and great fig-trees strike root in the massive brick castle walls. The very towers, roofed and battlemented with a gallant swagger, are used for drying linen and parching maize; and our conductor looked out, over the red farm-roofs, the vine-trellises and mulberry tops, the green meadows dotted with cows, the squares of papery maize, up towards the amphitheatre of conical mountains, where Bergamo is piled majestically between her Alpine valleys, and down towards the immense Lombard plain, with its horizon marked by belfries and poplar clumps; looked round, very much as old Bartolomeo must have done when he suspected treason. But the invader, nowadays, was only a great storm of loose-meshed thunder-clouds, driving up from the distant, invisible Po. "It would be a pity if it rained hard just when they've begun picking the grapes," he remarked.

It did not; and, as we drove homeward in the pale, luminous sunset, the balls of the Sunday players at *tamburello* were flying high above the village plane trees, as high as the bronze saint who, in this former Venetian province, surmounts the extinguisher of the pointed belfries.

Asolo, Le Mura, Casa B., October 2d. — Here we are in the kingdom of Queen Catherine Cornaro, the mountain town — I had almost said village — which the Venetian Republic gave the widow of Lusignan in exchange for her realm of Cyprus. At the foot of the hills extends what was once her famous pleasure-garden: damp fields of parched maize, and brilliant green grass all dotted with lilac crocus. Among heaps of manure and rotting maize-husks stands her palace. The peasants who inhabit it are the most wretched I have ever seen in Italy, tattered, starved-looking. But the house which shelters their ragged selves and their fodder is still ornamented with frescos of faded but lovely color. Between the ghosts of escutcheon-bearing cupids, you can still trace Apollo pursuing Daphne, and a golden lady — Venice, or Queen Catherine herself (?) — riding a winged lion. Outside, the sickly little children slip and tumble about on the dung-heaps.

Our first morning at Asolo was market-day: the porticoed streets and little squares were crammed with men in blue homespun and odd Puritan hats, and women with kerchiefs folded turban-wise about their heads; also with flocks of sheep and droves of turkeys. It was only when the crowd had trickled down the hills, and the booths, the pottery, tinware, shawls, kerchiefs and beechwood pails and ladles were carted off, that one grew aware that the houses all round were palaces, and the village a little capital. For these windows with their broken pipkins of carnations, their petroleum boxes full of geranium and sweet basil, their lines of drying linen — these windows are of the delicate trefoiled Ca'd'Oro pattern, or the more majestic early Renaissance; and wherever the Asolans had been too poor to whitewash, there are frescos, streaks of lilac and orange, heads of heroes, coats-of-arms, or pomegranate patterns peeling away.

For, where the brokers drag contracting parties by the hand, and yell over the sale of sheep and turkeys, and the mercers bawl the praises of their coverlets and swaddling bands, four hundred and three years ago (October, 1489) the Queen of Cyprus made her triumphal entry under a canopy of cloth of gold, followed by the Rector of Venice (?), a Cypriot chaplain, and a secretary ("an excellent poet and no mean philosopher"); children bearing branches in front, and a dwarf carrying her train behind.

But to us English folk Asolo evokes romance deeper and more splendid than that of Catherine Cornaro; nay, if we think of her, is it not as "Kate the Queen" of the song? For down below are the mills where Pippa spun the silk, and up the hill a house, with long plant-houses, where Sebald and Ottima met, even as Romeo and Juliet did in that vault at Verona, and Shylock counted his money on the bridge at Venice. And at this moment, with the vines creaking in the wind, am I not writing on the lid of that spinet on which the poet fumbled for tunes for the theme, perhaps, of Galuppi's toccata?

Asolo, October 4th. — I seem to have got at last to the country I have so longed for and wondered about — the background country of Giorgione and his imitators, and of Titian, when under Giorgione's influence. This landscape (as was pointed out by Mr. Pater in his splendid essay) is so like certain English parkland in its foreground that one begins to doubt whether it exists in Italy at all, or ever did exist, save in the wishes of the painters. It is not the scenery which Titian uses in his later pictures, and Giorgione himself for his Moses and Solomon; there are neither mysterious lakes nor Alpine crags. It is, on the contrary, a landscape which seems made to restrain the fancy, to force the meditative mood back upon itself. Dells of soft grass closed-in by rounded knolls of autumnal trees, places shaped like a lute to catch and keep the music of calm afternoons and autumnal moods. No country could be made up principally of such landscapes; these are rare spots, answering to rare states of peace and meditative happiness, and it is the painter's selection which allows us to believe that they form a world apart. In reality, here, where one does meet them, they are surrounded by very different things: by mountain-sides with clinging villages; blue, wavy plain Venice-wards; valleys narrowing up to distant Alpine heights, or widening with great beds of shingle and shelves of rock, like that of the Piave, which Bellini must have thought of in his tragic moods, as backgrounds for desolate Gethsemanes beneath rolling sunset clouds. The Giorgionesque spots are rare, and also very small. Only familiarity with the country, the habit, perhaps, of seeking shade and rest while rambling in these hills, the passing wish that friends and music and wine and beloved woman might be added to such cool and peaceful beauty, could have singled them out amongst the rest; and Giorgione, we know, was born but a few miles hence.

This country of Asolo is very grassy; even under the hillside vines grass grows instead of harvest stubble, and the grass sits short and soft, in deep folds and swellings, upon the uneven land. The hornbeam also grows freely, forming most of the hedges; and where the ground rises, chestnut-trees are grouped together, unclipped, and forming, like northern beeches, dome-like knolls. Where the little grove ends, at a dip, there will be a glimpse of distant blue hills; those of Vicenza, or the egg-shaped Euganeans, a ripple of ultramarine plain dotted with white houses catching the lower lights; perhaps, in a corner, a farmhouse or a pointed belfry of Venetian shape. The sheep, brown and white, nibble the juicy grass, and over the hedges comes the sound of invisible cow-bells. Autumn has begun turning the green trees to russet, evening to change the blue sky to green and opal. The naked nymph of the *fête champêtre* has gone to draw water at the well, cooling the glass jug first. Her sister and the two curly lads (one, surely, Giorgione himself) have stopped playing to watch the sheep coming home for the evening. In some hidden spot the young mother of the Giovanelli picture is suckling her baby in the shade, while the father, in crimson dress of man-at-arms, keeps watch yon side the brook. Farther off, who knows, Apollo may be pursuing Daphne close by the weir, and Cupid descending from sunset clouds above the white village church. These are the places. Rare spots, rarer moods, into which the painter has dreamily led us, following the embosoming, enveloping line of grass dells in the sunset, to the sounds of distant evening bells.

[To be continued.]

BOOKS AND PAPERS

IT would be curious to inquire into the probable development of American sculpture, as influenced by the resources for study, in the shape of collections of casts, which are already available in all our large cities, and are being rapidly accumulated in towns of the second class, and have found their way even into our public schools. It is from these collections that our future sculptors will inevitably derive their early inspirations, for the reason that they are, or will be, widely distributed and open to every one, and will form almost the only examples of figure-sculpture to be found in a country so poor as ours in works of art; and the wide selection of models which they present must favor a catholicity of taste which has not been hitherto a common feature of artistic education. We remember once visiting the Boston Museum of Fine-Arts with the sculptor Bartholdi. Passing through the archaic section of the sculpture galleries, his attention was arrested by the cast of the Gate of Lions at Mycenæ. He had, apparently, never heard of this monument before, for he inquired what it was; but he was much impressed by the noble composition, and studied it long and carefully, expressing afterwards his admiration. It is needless to say that if Bartholdi, who is noted among French artists for the extensive range of his knowledge and accomplishments, had never heard of the Lion Gate, his fellow-craftsmen in Paris would not be likely to have a profound knowledge of archaic Greek sculpture; and, in point-of-fact, it is doubtful if many of them know anything at all about that subject, or if they know much about sculpture of any sort beyond the kind favored in the *atelier* in which they receive their training. St. Gaudens himself, an American by birth and early training and with all the American passion for gaining new ideas, completed his professional education in France without knowing anything of the French Romanesque sculpture, for which he afterwards, when his attention had been called to it by chance, conceived a great admiration. If the French, whose greatness in art is familiar to all the world, can train their faculties with so small a range of examples, what will be the effect, upon students of equal power of imagination, of a training of much wider scope. It will be said that the education of French artists is so thorough that they can appreciate good art in styles unfamiliar to them; and this is perfectly true; but it does not follow that the result is the same as if they were already familiar with a wide range of styles; and it is to the work of students who have sought the true principles of art in the work of all ages that we look, in this country, with anxious anticipation. That many of our artists will suffer from indigestion, through their incapacity for assimilating the mass of varied nutriment presented to their minds, is probable enough; but, for a strong digestion, a variety of nutriment is advantageous, and the great artist of the future will be one whose simplicity of style has been gained through a wide knowledge of all styles.

For the intelligent study of the great works of antique sculpture, something more is necessary than random inspection, even with the help of a bare list of names. Especially in archaic art, which, when properly understood, is perhaps more full of instruction than any other, is it desirable to lead the student carefully, giving him the information necessary to enable him to penetrate the unprepossessing

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exterior, and discern the workings of the spirit of the artist, struggling to break the bonds of precedent and ignorance, to realize the vision by which it is possessed. In Mr. Robinson's book,[1] which, far from being a dry string of labels, is, practically, an interesting treatise on Greek and Roman sculpture, such information of this sort as is available is presented, in such a way as to make a tour of the sculpture-rooms in the Boston Museum of Fine-Arts with its aid an excellent introduction to the study of sculpture from the artist's point-of-view, as well as from that of the archæologist; and it is much to be hoped that students of art, among whom students of architecture are now, in this country, definitely ranked, will not fail to make trial of it. Although the numbering of the articles in the Catalogue of course follows that of the subjects in the Boston Museum, it will not be difficult to identify the same subjects in any large collection; so that the book will be just as valuable, if not, perhaps, quite so convenient, in New York, or Chicago, or Cincinnati, or Detroit, as in Boston.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

ENTRANCE PORTICO: TOWN-HALL, BILLERICA, MASS. MESSRS. H. LANGFORD WARREN AND LEWIS H. BACON, ASSOCIATED ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued with the International and Imperial Editions only.]

ACCEPTED DESIGN FOR THE EAST ORANGE NATIONAL BANK BUILDING, EAST ORANGE, N. J. MESSRS. LUDLOW & VALENTINE, ARCHITECTS, NEW YORK, N. Y.

THE building is to be built of a light-buff brick, with stone trimmings throughout the first story and terra-cotta above. It is to have a granite base course, and exterior steps of the same material. The interior is to be trimmed with oak and ash throughout, with mosaic tile vestibule floors and Georgia pine elsewhere.

HOUSE FOR LOUIS CABOT, ESQ., BROOKLINE, MASS. MESSRS. STURGIS & CABOT, ARCHITECTS, BOSTON, MASS.

HOUSE FOR PROFESSOR SCHWAB, NEW HAVEN, CONN. MESSRS. STURGIS & CABOT, ARCHITECTS, BOSTON, MASS.

COMPETITIVE DESIGN FOR THE EAST ORANGE NATIONAL BANK BUILDING, EAST ORANGE, N. J. MR. R. K. MOSLEY, ARCHITECT, NEW YORK, N. Y.

[The following named illustrations may be found by reference to our advertising pages.]

PALAZZO FARNESE, CAPRAROLA, ITALY: PORTION OF PAINTED CEILING IN THE HALL OF COUNCIL.

GROUP OF WROUGHT-IRON GATES.

GROUP OF PULPITS, ETC.

GROUP OF URBAN CHURCHES.

[Additional Illustrations in the International Edition.]

TOWN-HALL, BILLERICA, MASS. MESSRS. H. LANGFORD WARREN AND LEWIS H. BACON, ASSOCIATED ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

THE building is of common Eastern brick laid in Flemish bond throughout with white-mortar joints. The stone trimmings are of Bedford, Indiana, limestone. The building contains on the ground story: the town offices, a large banquet-hall with adjoining kitchen and a lock-up. The second story is occupied by the main hall with entrances, cloak-rooms, stage and dressing-rooms. The woodwork of the interior is selected cypress.

THE BRANDENBURG GATE, POTSDAM, PRUSSIA. GEORG CHRISTIAN UNGER, ARCHITECT.

[Gelatine Print.]

THIS gateway, built in 1770, and in its time held the finest piece of work in the town, is based on the triumphal arches at Rome. Like the Berlin Gate it originally formed part of the town wall. The structure measures twelve metres to the main cornice, while the attic adds three metres to the height. The central archway is five metres in width, and has a depth of nine metres. The figures in the spandrels are by the sculptor Gerrin and the coat-of-arms and supporters above were modelled by the sculptor Jenner.

ENTRANCE TO IMPERIAL STAIRCASE IN THE RÖMER [TOWN-HALL], FRANKFORT-ON-THE-MAIN, GERMANY.

[Gelatine Print.]

ALTHOUGH the curious large and interesting guild-hall known as "der Römer" dates from 1602-7, the feature here shown is to be found in addition in the smaller court-yard, which was built about the middle of the eighteenth century.

DWELLING-HOUSE IN CHARLOTTENBURG, PRUSSIA. HERR F. GOTTLOB, ARCHITECT.

THIS plate is copied from *Architektonische Rundschau.*

COMPETITIVE DESIGN FOR TECHNICAL INSTITUTE AND LIBRARY, WEST HAM, ENG. MR. J. M. BRYDON, ARCHITECT.

THIS plate is copied from the *Builder.*

CORNER OF BILLIARD-ROOM: WEST DEAN PARK, SINGLETON, NEAR CHESTER, ENG. MESSRS. ERNEST GEORGE & PETO, ARCHITECTS.

[1] "*Catalogue of Casts, Part III, Greek and Roman Sculpture.*" Museum of Fine-Arts, Boston: By Edward Robinson, Curator of Classical Antiquities. Revised 1896. Boston and New York: Houghton, Mifflin & Co.

NOTES & CLIPPINGS

THE FRENCH NATIONAL LIBRARY. — The accommodation for readers in the Salles de Travail of the National Library at Paris, writes a *Pall Mall* correspondent, is becoming insufficient for the ever-increasing crowd of writers and artists who flock there from all parts of the world. In the main reading-room it has been impossible during the winter to find a seat after two o'clock. The increase in the number of students has been marked within the last year. In 1894 the readers numbered 135,170, and the works consulted 444,435; in 1895 these figures grew to 135,485 readers and 447,480 books. The public reading-room had during last year 59,963 readers, to whom 78,774 books were supplied. In the manuscript room, frequented by the erudite, 35,306 valuable original records were consulted. There has been a similar demand upon the print department. This constantly increasing pressure upon the accommodation has called the attention of the central administration to the necessity of extending the library buildings in the line of the Rues Colbert and Vivienne, and it is understood that the carrying-out of this undertaking will not be much longer delayed. The architect, M. Pascal, estimates the cost at $280,000, the expense of which would be spread over five or six years. The scheme provides for the building in the Rue Vivienne of a vast oval reading-room, with shelf room for 15,000 volumes available always for public reference. This room is to stand in a building by itself, is to be lighted by electricity, and to be open in the evening. In addition to the 15,000 volumes to which the public will have unrestricted access, all the other works in the library will be supplied during the day on the customary application. This will be a boon that has long been desired. — *Pall Mall Gazette.*

WHY A PORTRAIT'S EYES FOLLOW YOU. — Wollaston's curious discovery was, that by adding to each pair of eyes a nose directed to the right or the left, the eyes lose their front direction and look to the right or left according to the direction of the nose. By means of a flap representing the lower features in a different position, as Dr. Wollaston remarks, "a lost look of devout abstraction in an uplifted countenance may be exchanged for an appearance of inquisitive archness in the leer of a younger face turned downward and obliquely toward the opposite side." As by changing the direction of the lower features we change the direction of the eyes, so by changing our position the eye of the portrait apparently follows us. If a vertical line be drawn through the tip of the nose and half way between the eyes, there will be the same breadth of head, of cheek, of chin and of neck on each side of this middle line, and each iris will be in the middle of the whole of the eye. If we now move to one side, the apparent horizontal breadth of every part of the head and face will be diminished, but the parts on each side of the middle line will be diminished equally, and at any position, however oblique, there will be the same breadth of face on each side of the middle line, and the iris will be in the centre of the whole of the eyeball, so that, being on a flat surface, the iris will be seen in front of the picture or obliquely. Brewster illustrates the subject in various ways and to him we refer, as well as to Wollaston's original memoir, in *Philosophical Transactions* for 1824. — *Notes and Queries.*

AN EARLY STATUE OF WASHINGTON. — The oldest statue of General Washington that exists is to-day used as a tobacco sign. It is the same memorial which stood in Battery Park for over a half century, was then moved to Washington Square, in 1843, where it remained until it was replaced by the beautiful white-marble arch — to-day the pride of New York City. It was during the Centennial in New York that the old wooden statue was removed to the court-yard on Chambers Street. Later it was sold at public auction for $300 to an antique collector, named Jacques, who kept it in his collection until his death. It was again sold at auction to David L. Schiff for a much smaller sum, and it was used as an ornament in front of his cigar store. The statue stands ten feet high, and is cut out of one solid block of oak, and weighs 800 pounds. It presents Washington in continental dress, blue coat, brass buttons, buff breeches, riding-boots, yellow vest, and ruffled shirt-front. The left hand rests on the hip and holds an old-time cocked hat. Worn and weather-beaten as the statue is, yet it is a very remarkable piece of work. — *The Churchman.*

THE VALUE OF LORD LEIGHTON'S HOUSE. — After Lord Leighton's death, his executors were ready to accept £35,000 for his house at Kensington and its contents. If any one had purchased the property, he would have made a wonderfully good bargain, for the recent sale of the contents of the house realized more than £35,000, while the house itself is worth £15,000. — *N. Y. Evening Post.*

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DR. J. H. GIRDNER, in the *North American Review*, seriously proposes that a society should be incorporated, having for its object the prevention of noise in cities. He points out that the nerves of city people suffer very much from the continual noise about them, and, as city noises are nearly all preventable, he thinks that a society, having in view their prevention, might accomplish an excellent work. As a suggestion for facilitating this work, he classifies city noises in six divisions, of which the rattling of vehicles is by far the most important, while the sound of bells and steam-whistles is probably next. After these come the sounds of music of various sorts, the voices of beggars and peddlers, and of cats and birds, and the reports of explosions. If all city vehicles were drawn by horses, as they were a few years ago, the abatement of the noise made by them would be a comparatively easy matter, for asphalt pavements are well known to be effectual in suppressing almost all the noise from vehicles drawn over them. Where electric-cars are used, however, the case is different, and the problem of reducing to silence a moving mass of loosely-hung windows, propelled by a fifteen-horse-power motor, revolving at a rate of some two thousand revolutions a minute, and guided by a man who continually kicks a bell, made intentionally large enough, and harsh enough, to attract the attention, above the roar of the streets, of people fifty feet away, is one which Dr. Girdner's Society will, we fear, wrestle with in vain.

IN streets not infested with the roaring and clanging electric-cars, there would be no great difficulty in procuring comparative quietness. Besides the essential asphalt pavement, for preventing the concussion of wheels, and the consequent rattling of vehicles and their contents, the passage of teams conveying particularly noisy loads might be prevented, or permitted only under certain regulations. For example, the most intolerable of all city noises with us is that caused by the passage of a wagon-load of iron bars. These bars are, in this country, usually thrown loosely into the wagon, and their free ends vibrate, clashing together with a fearful jangling. In Paris, this sort of nuisance is suppressed by the simple method of compelling all persons concerned in the transportation of loads of such bars through the streets to see that they are firmly tied together at their ends, so that rattling is impossible. Loads of boards often cause annoyance in the same way as iron rods, and their rattling can be prevented in the same manner. Next to the rattling of vehicles and their loads, certain sounds of manufacturing, including the screeching and din of whistles and bells, are probably most troublesome. Many a steam-boat, or factory, or ferry-boat whistle can easily be heard five miles away in a still morning, and every New Yorker must know the chorus which resounds through the city at seven o'clock every morning. Here again, while a large part of this noise is unnecessary, and might be suppressed, some of it is unavoidable. If, however, the avoidable noises of American city life can be mitigated, a great deal will be gained. As a rule, American operations seem to be carried on purposely with the greatest noise possible, instead of the smallest. While, in a foreign railway-station, the trains glide in and out in almost complete silence, giving notice of their departure only by a single momentary whistle, our larger stations present a foretaste of pandemonium. All the trains that enter and leave them do so to the accompaniment of the violent ringing of a twenty-five-pound bell, mounted on the engine, mingled with the hissing roar of the steam from the safety-valve, it being the regular American practice to keep up steam at all times to the working pressure, and trust to the safety-valve to relieve the sudden strain thrown on the boiler by shutting off steam from the cylinders. In addition to this, the fire is generally pushed under locomotives waiting for the moment of departure, until the steam pours steadily from the safety-valve, with a noise which makes conversation impossible within twenty-five feet of them. To make themselves heard through this uproar, the signal-calls of the train-starter to the engineer are given by huge electric-bells; and, to complete the din, great rattling trucks, propelled by hand, convey the baggage in all directions through the crowd. Nearly all this terrible noise might just as well be dispensed with, and, without being Sybarites, we may fairly ask for some relief from the habitual uproar which is helping most efficiently to disorganize the nervous systems of our people.

WE are in receipt of a letter asking us why we cannot organize an expedition to explore the corridor beneath the Pyramid of Cheops at Ghizeh, which, as our correspondent observes, is said by Rosengarten not to have been investigated. We are glad to note evidences of an interest in archæology on the part of students, but if present conditions warranted our fitting out expeditions in behalf of science, it would hardly be to Egypt that we should send them. Rosengarten, it must be remembered, is a very old authority, and the passageway under the Great Pyramid has long been accurately known. If our correspondent has an ambition, as we hope he has, to learn something not yet known about antiquity, the most promising field for amateur investigation is probably to be found in Southern Italy and Sicily. Both these regions were, until the time of the Carthaginian Wars, purely Greek, and even under the Roman Empire they retained much of their Greek civilization, while their population is in great part Greek to this day. Readers of Napoleonic history will remember that Greek was currently spoken among the old families of Corsica in the time of the Bonapartes. According to Madame Junot, Napoleon himself understood it, and her own mother, when she was excited, always spoke in Greek. The great Italian statesman, Crispi, is a native of a village in Southern Italy where Greek is said to be still the language of the peasantry, and this is said to be the case in many other places. We know that Greek civilization in the Italian colonies was carried to a great height, and Sybaris, Syracuse and Tarentum far surpassed in wealth and luxury the cities of Greece proper. Sybaris, as we know, lies practically intact, buried under the mud of the river Crathis, and those who have seen Pompeii can imagine what wonders the much larger, and purely Greek city has in store for some courageous explorers; while a careful study of the present Greek population of the Peninsula ought to throw much light on the characteristics of their Hellenic ancestors.

THE *Engineering Record* mentions a curious effect of the currency agitation which has well-nigh destroyed the building business for the present. The last Congress appropriated sixty million dollars for river and harbor improvements,

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and the War Department is busily engaged in preparing specifications and plans, in order that the work may be put under contract. The law requires that advertisement shall be made for proposals for work of this sort, and advertisements have already been published, inviting proposals for four of the contracts out of the thirty-six into which the work has been divided. It might be imagined that in these times of idle hands and general depression there would be many bidders for contracts amounting to several million dollars; but, up to this time, not a single bid has been received. The explanation of this, as given by contractors, is that the contracts, like all similar Government contracts, provide that payments shall be made in lawful money; and, as the work is likely to extend over several years, no one with money to lose wishes to furnish a large amount of work and materials for which he must accept payment in such dollars as may be made legal tender by Act of Congress when his work is done. If the transaction were with a private owner, the contractor could, for the present, protect himself by stipulating that the payments for his work should all be made in money at the present gold standard; but there is no authority in law for such a stipulation in contracts with the Government, and, even if there were, it is very doubtful whether it could be enforced, if the Congress should take it into its head to declare all such stipulations void, as it would be quite likely to do if the principles of the Chicago platform should prevail. Under such circumstances, the most reckless contractor hesitates before risking his own property, and that of his bondsmen, upon the outcome of an election, and it seems quite likely that the bidding, and, in consequence, the commencement of the work, will be postponed until the standard of value has been settled.

WE cannot say that we have a very high opinion of the collections of ready-made plans which are so extensively sold in this country, as compared with the work of a thoroughly accomplished architect; but they may, at least, be useful in places where the science of house-planning is less developed than it is here, and we are quite inclined to suggest that their authors might, with advantage to themselves, circulate them in Germany, where, judging from the plans of dwelling-houses which we find in some of the German professional journals, they would be looked upon as marvels of ingenuity. A certain corporation in Germany has undertaken the business of building houses for sale, according to certain stock designs, of which we find a selection, accompanied by estimates of the cost, exclusive of land and foundations. Concerning the exterior aspect of the houses, as shown in the perspective views, we will say nothing, as such things may suit the German taste, whether they please ours or not; but the floor plans are legitimate objects of criticism. The estimated cost of the houses, above the foundation, ranges from twenty-four hundred to seventy-two hundred dollars, so that they belong to the class in which, in this country, evidences of careful, and sometimes of very skilful planning would generally be found; and it might be presumed that an incorporated company, intending to build a large number of houses from the same patterns, and possessing capital enough for such extensive operations, would avail itself of skilled professional advice at the outset in determining its stock designs. We do not say that this was not done, but if so, the ideas of German architects on house-planning are very different from ours. Out of the eight houses whose plans are given, four show the only water-closet in the house just inside the front door, with its little window to the outside forming a conspicuous element in the entrance *motif*. After getting past this feature, we reach the door of the kitchen, which, in every one of the eight plans, opens directly into the front hall, within a few feet of the front door. Even in the seventy-two-hundred-dollar house there is not the slightest trace of the "cabbage cut-off," in the shape of a pantry, or vestibule, between the kitchen and the stairway, which would here be considered indispensable for even the smallest and cheapest of the houses shown.

UPSTAIRS, the characteristic weaknesses, as we should consider them, of German planning are even more conspicuous. Two of the houses possess a bath-room, which in both cases is reached only by passing through one of the chambers. In fact, in one case the only way to get to the bath-room is to go through all the masters' bedrooms in succession, these apartments, owing to a difficulty with the stairs, having only one doorway from the staircase hall, and following each other *en suite*, and winding up with a sewing-room, which forms the fifth in the series. Whether it is that only one person in a German family is allowed the luxury of bathing, or that the apparition at intervals in the sleeping-rooms of people wrapped in towels, on their way to or from the bath-room, is not considered inconvenient, we cannot say; but even in Germany, the advantages of the American system of planning, by which all the chambers, and the bath-room, if there is only one, have independent entrances from the hall, so that any one in the house can have a bath at any time, without waking up the rest of the family, must be apparent. As for closets, it is hardly necessary to say that no provision is made for such things in the plans before us. There is, to be sure, in some cases a store-room attached to the kitchen, and several of the plans have a "Bodenkammer," or what we should call a trunk-room, somewhere in the second story, but beyond these there is absolutely no representative of the multitude of closets which every American housekeeper finds indispensable to her comfort. In this country, the smallest of the houses on the list, which has only two rooms in the second story, would have at least five closets, and the largest one, costing seventy-two hundred dollars, would probably have fifteen. How much more convenient these are than the small, expensive and rickety wardrobes which do duty for closets everywhere in Europe, no one need be told; and, for this, as well as other reasons, the American system of planning might, with a little effort to bring it to the notice of intelligent people, become, as we think, very popular, at least on the Continent.

A TEST of masonry laid in freezing weather was made recently in Riga, Russia. The climate of Riga is cold enough to satisfy any requirements for such a test, and the experimental piers were exposed for several years to the weather, so as to show decisively the resistance of the different sorts of frozen mortar. Fourteen piers were laid, some with ordinary, and some with very hard bricks, some with lime and sand alone, some with the addition of salt, some with Portland cement and lime, and one with Portland cement alone, to five parts of sand. This pier proved far stronger than any of the others. The bricks were laid wet and warm, and the cement, which was of a slow-setting variety, hardened without difficulty, although the work was exposed to a temperature below the Fahrenheit zero. Years afterward, the pier rang clearly on being struck, and the bricks were with difficulty separated from the mortar, the iron bar used to loosen them sometimes breaking the brick, rather than the mortar. Of the other piers, those laid with a mortar of three parts lime to one of Portland cement, and nine parts of sand, stood best, an iron bar being required to loosen the bricks. In this case, also, the bricks were laid wet and warm. The addition of one-and-three-quarters per cent of salt to the water used for slaking the lime made, with three parts of sand, a mortar which resisted frost successfully, here, as before, the bricks being laid wet and warm. Except with cement, however, the wetting of the bricks does not seem to have been essential, for piers laid with dry bricks showed nearly or quite as much resistance as the others. It was found, however, that the hard-baked "iron bricks" gave much better results, either wet or dry, than common bricks, so that the absorption of the water from the mortar by porous bricks, laid dry, is evidently a thing to be avoided in cold, as well as in warm weather.

THE construction of the Jungfrau railway has actually begun, one hundred workmen having been engaged, since August 1, on the first section of the line. Visitors to Interlaken will remember the Black Lütschine river, which comes from the peaty meadows toward Brienz, and joins, at the hamlet of Zwei Lütschinen, the White Lütschine, whose waters come loaded with pulverized rock from the glaciers of the Eiger. The waters of the twin river are to be used to drive the air-compressors and electric machinery for use in excavating the tunnel, which forms much the larger portion of the line. In fact, the impossibility of building a surface road over a peak covered with eternal ice and snow, and exposed to continual avalanches, has been evident from the first, and all the plans for the line have contemplated an underground route from a point not far above the plain of Interlaken to the summit, passing under the glaciers which extend down the mountain nearly to the valley.

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THE REVOLVING STAGE AT THE MUNICH ROYAL RESIDENTIAL AND COURT THEATRE.

MODERN stage-settings and scenic appliances demand the attainment of realistic effects. Scenes representing interiors, architectural decorations and large open-air or landscape scenes require a great many preparations and the employment of such a large number of stage-hands and stage-help as to offer in some cases almost insurmountable difficulties to the stage machinist and the scenic artist.

The invariable consequence of these modern requirements of stage-setting has been the lengthening of intermissions between the scenes, or the acts of a play, and the spectators are very apt to become impatient. Very long intermissions between the acts are bad enough, but long pauses between the various scenes of the same act are worse, because they take the spectator away from the illusions of the play. Practically, for instance, a play of Shakespeare, requiring many changes of scenery, is at times drawn out to about the length of twenty acts.

At the Munich Court Theatre, an attempt was made some years ago to overcome the difficulty, by arranging the scenes in such a manner that the front part of the stage remained unchanged while different prospects or views were arranged on the raised rear part of the stage. This plan, however, proved only partly successful. Herr Karl Lautenschläger, the stage machinist of the above theatre, set about to devise a better plan, and in 1894 he came forward with a new proposition which he described in his monograph, entitled

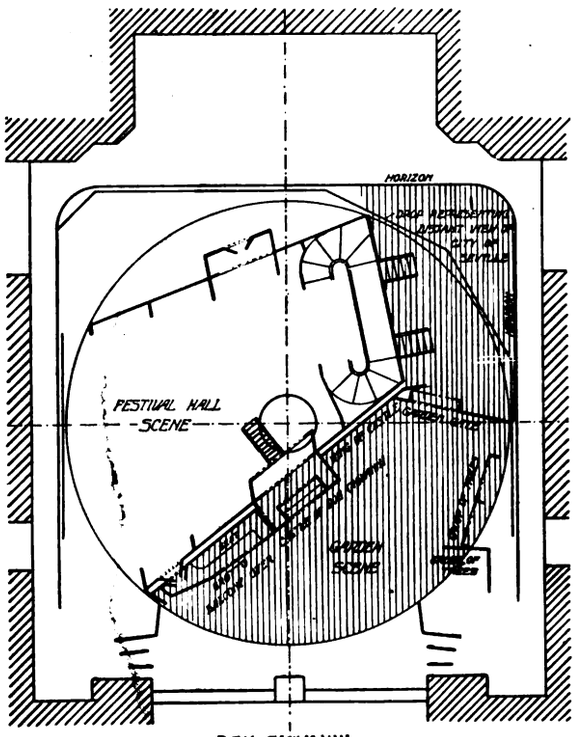
A scene, for instance an interior view, is built up on that portion of the stage which opens towards the auditorium; a similar scenic setting can at the same time be placed on the opposite side of the circle, and the same is true of the right and left quarter circles of the turn-table, which can thus be made to hold four scenic decorations at the same time.

For a four-act play or for four scenes of one act, all the scenes can, therefore, be prepared and set up beforehand, thus doing away entirely with the necessity of long intermissions. It takes but ten seconds to revolve the table a quarter-circle turn, and as soon as this is done the next scene is ready.

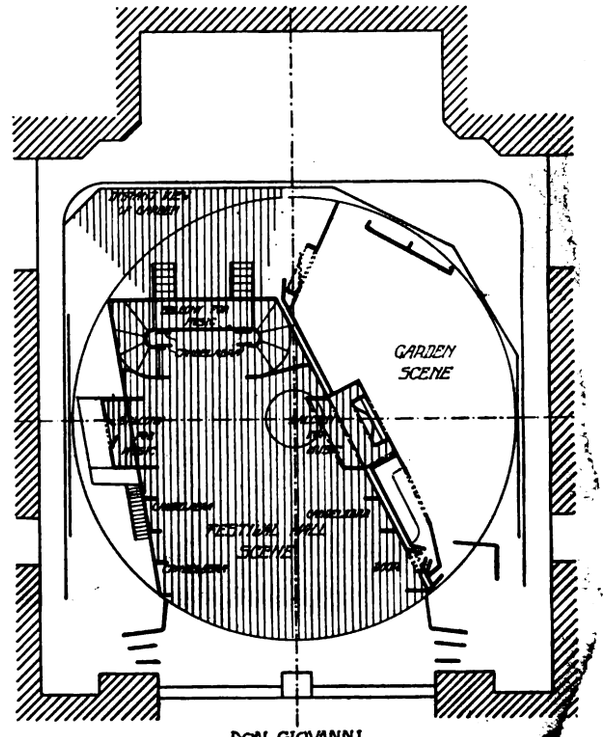
The same is done where one act has several scenes, and when the first scene is over, the setting for the second act can be begun at once.

The turn-table permits the setting up of any kind of scenery, not merely of interiors. The scenes may vary in size and depth, and even should a scene require the whole of the stage, the arrangement is still practicable, but of course leaves a smaller space for the side scenes.

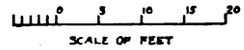
Where two scenes with great depth of stage-setting follow each other (for instance, landscapes with views in the distance), the inventor of the revolving stage overcomes the difficulties by placing the decoration parallel to the radius of the turn-table, getting thereby a rather foreshortened perspective. He is thus enabled to gain the necessary depth for the scenery of the following scene. Moreover, he introduces into the stage-setting an element of picturesqueness and of greater freedom, and likewise more artistic elements.



DON GIOVANNI
ACT I SCENE 3
PLAN OF STAGE SHOWING
DON GIOVANNI'S GARDEN
FIG 1



DON GIOVANNI
ACT I SCENE 4
PLAN OF STAGE SHOWING
FESTIVAL HALL
FIG 2



"Description of a Theatre Stage with Revolving Stage Floor, and with all Stage Machinery Operated by Electricity." The theatre manager of the Royal Theatres at Munich, Herr Possart, at once took up the plan, and decided to give it a practical trial in the Munich Court and Residential Theatre. This trial took place the last week in May of this year, and showed the plan of a revolving stage to be entirely successful and practical.

The critics were at first inclined to compare this novel arrangement with that used in the Japanese theatres, which have a sort of a turn-table in the centre of the stage, but the two arrangements are really quite dissimilar. The plan of Herr Lautenschläger might, rather, be considered as being similar to the one used in the United States and in England for the setting of "living pictures," though the latter arrangement has not yet been adapted here to the management of theatre stages.

At the Munich Theatre the revolving stage was arranged substantially as follows: A turn-table of sixteen metres in diameter (about fifty feet) was placed on top of the regular stage floor, whereby the latter was raised slightly, and with a proscenium-opening of about ten metres (thirty-four feet) not quite a quarter circle is visible from the audience. The turn-table is rotated by means of electrical transmission of power, the table turning on rollers, which run on a circular track.

To illustrate this novel form of revolving stage further, we reproduce herewith, from a recent issue of *Ueber Land und Meer*, a German weekly pictorial, two plans and one perspective view of the stage.

Figure 1 illustrates the stage-setting and position of the turn-table for the third scene of the first act of the play "Don Giovanni," which represents a garden scene. By revolving the stage platform, the scenery is changed into the festival-hall of Scene 4 of Act I, as shown in plan (Fig. 2).

As will be seen from the plans, the depth of the stage in each scene is nearly entirely taken up by the stage-setting.

The perspective view (Fig. 3) illustrates the revolving stage during the change from Scene 3 to Scene 4.

Any system of stage-setting may be used on such a revolving stage; but in conformity with modern ideas the usual old-fashioned parallel wings are not used. For interiors, so-called closed set-pieces are used. Open landscapes are built up largely with movable pieces, and use is also made of the "horizon" of the Asphaleia stage, consisting in a painted canvas, surrounding the stage on three sides and tinted in different sky and cloud effects, which canvas may be revolved to obtain any desired atmospheric conditions with the aid of the stage-lighting effects from colored lights.

The perspective view (Fig. 3) illustrates the arrangement of a

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revolving stage, as proposed by Herr Lautenschläger for new theatre stages, and in this case the entire under-stage is intended to be made to revolve, whereas, as already stated above, in the experimental revolving stage of the Munich Court Theatre, the old fixed stage was kept and a revolving turn-table placed upon the same. In larger theatres the under-stage is built in two tiers, and is provided with all usual and necessary traps, etc.

Such a revolving device approaches more perfectly the ideal stage for use in connection with electric power, and it is to be hoped that the larger National Court Theatre in Munich may soon be equipped with the new device in its entirety.

A few words in conclusion about the ingenious inventor of the new revolving stage:

Herr Karl Lautenschläger was born April 11, 1843, near Darmstadt, Germany. His foster-father was an actor at the Grand Ducal Theatre, and this fact caused him to have early contact with the stage. He himself showed early signs of talent for the stage, but his parents objected to his taking up this career. Thanks, however, to the intervention of the theatre machinist, Herr Karl Brand, he received a thorough education as a mechanical stage-engineer. He occupied responsible positions at the theatres in Riga and Stuttgart, and in 1880 he moved to Munich, where he received a permanent position in connection with the Royal theatres; but he did not confine himself entirely to the work in the Munich theatres. There is to-day not one new theatre-building of any importance in Germany in which the stage machinery and stage-setting have not been either entirely or partially designed by him, or in the construction of which he did not act as advisory or consulting engineer. Even beyond the limits of his own country his fame has reached, and several years ago he achieved a great triumph in London in the mechanical stage arrangement for the Empire Theatre. Combined with a thorough technical education and great natural ability, Herr Lautenschläger has the feeling of a true genius and artist.[1] W. P. G.

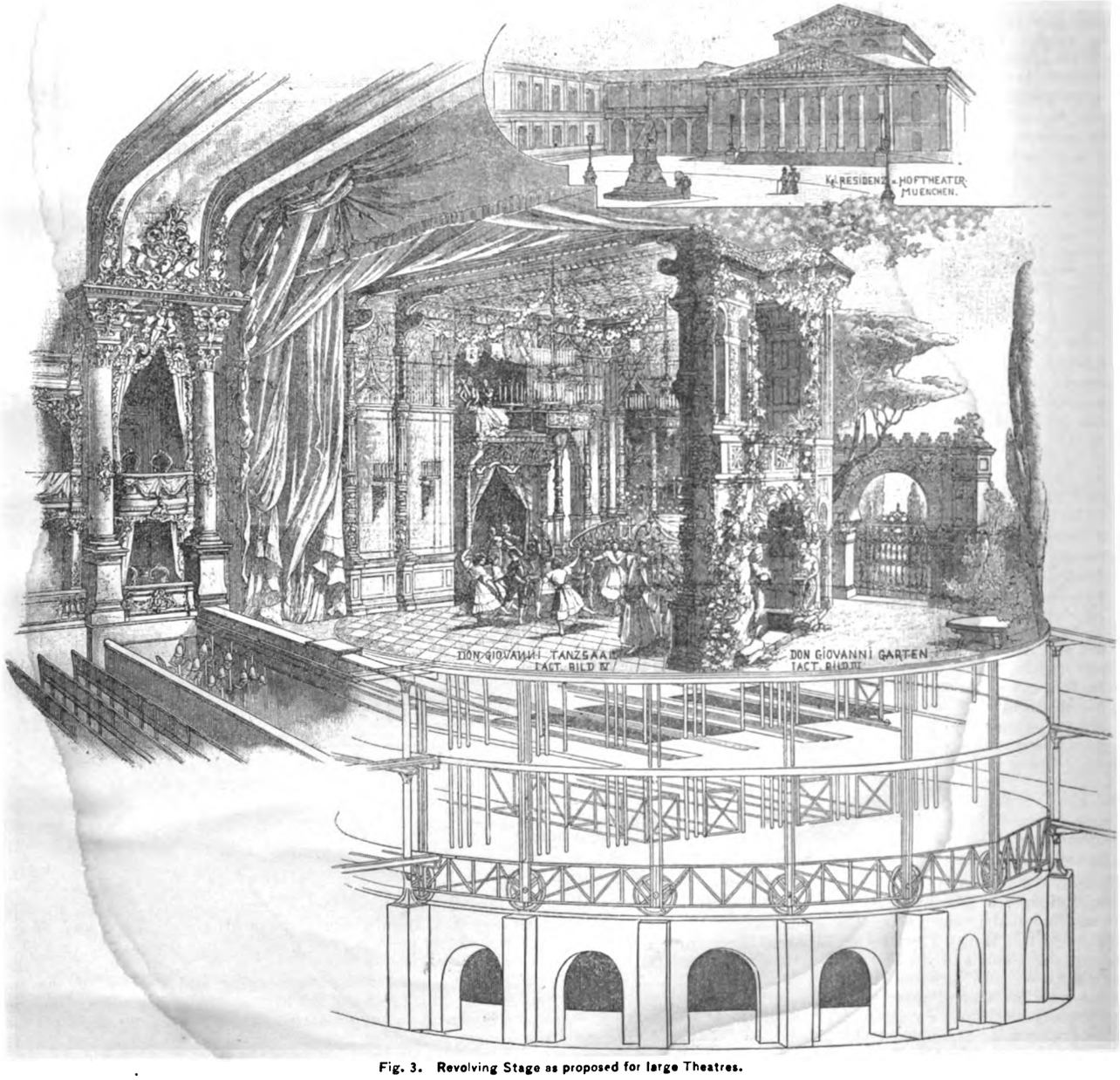


Fig. 3. Revolving Stage as proposed for large Theatres.

SIR JOHN MILLAIS.

A GREAT painter has passed from among us and a great personality has faded away into the unknown land. For the last forty years, the pictures Millais had painted for the spring exhibitions were the talk of the town as May drew near, in so far as the town consisted of the cultured few; and even the ignorant many propounded all sorts of outlandish opinions upon the great artist's various new departures. Artists admired the splendid *technique* and looked with pleasure or pain, according to their temperaments, upon his last new development. Intelligent amateurs praised or abused his work — mainly his happy or his uncomfortable composition — according to their divers tastes. Even our old friend "who knows nothing about art, but knows what he likes," found endless opportunities for vapid talk, in order to express, mostly, what he did not like.

The younger generation, who only know Millais by his later work, or who look upon the "Huguenot" as a fine work of an archaic order, have no conception of the furious onslaughts made upon some of the painter's works in the "fifties.' Even Mr. Ruskin sometimes lifted up his voice in sharp-tongued rebuke, as witness his criticism (1857) of the quaint "Sir Isumbras crossing the Ford": "As it is possible to stoop to victory, it is also possible to climb to defeat, and I see with consternation that it was not the Parnassian rock which Mr.

[1] Free use is made in this article of a sketch by Herr Holthof in *Ueber Land und Meer*.

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Millais was ascending, but the Tarpeian. The change in his manner, from the years of 'Ophelia' and 'Mariana' to 1857, is not merely fall — it is catastrophe; not merely a loss of power, but a reversal of principle; his excellence has been effaced, 'as a man wipeth a dish — wiping it and turning it upside down.' There may still be in him power of repentance, but I cannot tell. . . . I have not patience much to examine into the meaning of the picture under consideration. If it has one, it should not have been disguised by the legend associated with it, which, by the way, does not exist in the romance from which it professes to be quoted and is now pretty generally understood to be only a clever mystification by one of the artist's friends, written chiefly with the view of guarding the awkward horse against criticism. I am not sure whether the bitterest enemies of Pre-Raphaelitism have yet accused it of expecting to cover its errors by describing them in bad English." Then he goes on to apply such epithets as these to the picture: "ill-painted," "errors too visible to need proving and too many to bear numbering," "coarse and ghastly in fancy," and so on. And here I must note a curious error of the critic — Mr. Ruskin finds fault with the reflections in the water. "The primal error in pictorial grammar, of painting figures in twilight as bright as yellow and vermillion can make them, while the towers and hills, far above and far more exposed to light, are yet dark and blue, could hardly have been redeemed by any subsequent harmonies of tone, much less by random brilliancy; and the mistake of painting the water brighter than the sky which it reflects, though constant among inferior painters in subordinate parts of their work, is a singularly disgraceful one for a painter of standing." Now, here Mr. Ruskin forgets that the water may reflect a part of the sky over the painter's head *and out of the picture;* and that, if the declining sun suddenly shone out from a bank of cloud, it might light up the faces of the knight and the children with a golden brilliancy, and yet not catch the hills and towers in the background. Every landscape-painter knows these facts and has noted them from time to time; and surely it is allowable to an artist to leave certain riddles to be solved by the intelligent and observing public. That Mr. Ruskin, so acute an observer, and generally so absolutely correct in his knowledge of nature and art, should have fallen into so strange an error, only proves that an infallible guide is sometimes extremely fallible.

Of the pictures of 1856, Mr. Ruskin was highly enthusiastic and certainly more just. Of "Peace concluded," 1856, he says: "Titian himself could hardly head him [Millais] now. . . it is one of the world's masterpieces. . . . I am not sure whether he may not be destined to surpass all that has been done in figure-painting, as Turner did all past landscape." Possibly these words might not be endorsed fully by the modern critic; but we who admire Millais's later manner can yet see the grandeur of the earlier style — "the *great* the *very* great," as Mr. Ruskin says, "picture of the fireman," — "The Rescue."[1] Possibly in the far future, the "Huguenot," the "Vale of Rest," the "Yeoman of the Guard" and some of the portraits, such as the magnificent "Cardinal Newman," will be the works upon which the foundations of his lasting reputation will be laid. No one who saw the Paris Exhibition of 1878 can forget the grand old "Yeoman," as he sat facing us on entering one of the long suite of rooms. French painters and connoisseurs went into raptures over it, and with reason. But, curiously, his early admirers and critics do not seem to have favored the change in Millais's style; they would not see that it was the development of an individual mind. Hear Mr. W. M. Rossetti, upon that marvellous quality possessed alike by Rubens, Rembrandt, Velasquez, Reynolds, Regnault, Henner and Millais, viz, *facility* — the ease with which they all, with one stroke of the brush, put a perfectly true and telling touch upon the canvas — a touch which was just sufficient and no more; the quality, in fact, of knowing exactly *where to stop.* "'Souvenir of Velasquez'[2] (diploma-work deposited in the Academy on his election as an Academician). It is not for an outsider to surmise whether or not the Academicians court the deposit of diploma-pictures which may have cost their painters, working with the quick-handedness of a Millais, *perhaps a couple of days' labor* [the italics are mine]. However this may be, they have here got a diploma-picture of that description and an admirable one, in its way, it certainly is. The resemblance to Velasquez is hardly such as to justify the title."[3]

Now, here we have exactly the *outsider's* opinion upon a work of art; but from such a writer as Mr. W. M. Rossetti we might have expected something different. Surely Mr. Rossetti ought to have known, even in 1868, enough of art in its widest sense, to have understood that the greatest work is, in execution, spontaneous. The artist may spend months in mental development of an idea; but once he takes brush or pen in hand, the most perfect and the greatest work is direct, and to the point. When Velasquez paints a jewel or a pearl, he knows exactly the right place for his high light; and once placed, he knows how to stay his hand. To the thorough artist, the man who has spent his life in study, "a couple of days' labor" is ample to paint a head; indeed, it is more than probable that a longer period spent upon elaboration would rather take away from, than improve the work. When Millais painted the "Huguenot" he was only a student, an advanced student from the "Isabella" period, but still a student. Witness the exactitude with which he copied the nasturtiums and ivy from nature — one might fairly call them fac-similes of nature; but when he gave us the "Yeoman of the Guard," or the "Souvenir of Velasquez,"[4] he was a master, and a great master, of the brush, though still a student of nature — possibly his only real master. Moreover, he had learned that greatest quality of the artist, the law of sacrifice. To copy nature is impossible (witness all the hopeless attempts of the Pre-Raphaelites' followers); but to render such an account of her beauties as will appeal to the spectator, and to represent her through the poor mediums at our command, is the work of the great artist.[5] That Millais meant his picture to be a souvenir of the little "Infanta Marguerite," in the Louvre, seems not to have struck the critic, or he would not have said that it did not "justify the title."

Of the early period, the "Vale of Rest"[6] will probably be held by most people to be Millais's greatest work after the "Huguenot." It could hardly be classed as belonging to the Transition period, for the ugliness of the nuns stamps it as an example of the Pre-Raphaelite School. It is a curious fact, that all revolutions in art seem to be a revolt against pre-conceived and popular ideas of beauty. A great painter like Reynolds starts up and makes the most of the beauty which surrounds him. His disciples follow suit; but gradually idealizing nature (as they call it), they turn handsome women into mawkish, simpering, passionless dolls, until reformers, disgusted with beauty as represented, turn their backs upon it, and become rabid disciples of pure ugliness. We have lately seen this revolt carried out by the Impressionists and the various Purple Schools, just as, nearly fifty years ago, it was set on foot by the Pre-Raphaelites; and in both cases it was a Nature-renaissance — as if nature were ever so hopelessly ugly as the faces of these poor nuns, or as many of the specimens of womankind presented to us by some of the Impressionist painters! That Millais had a purpose in representing convent-life thus, is certain; and I cannot refrain from quoting Mr. Ruskin once more, as his characteristic words probably express the painter's own thoughts: "If you think what the kind of persons who have strength of conviction enough to give up the world, might have done for the world, had they *not* given it up; and how the King of Terror (Death) must rejoice when he wins for himself another soul that might have gone forth to calm the earth, and folds his wide white wings over it forever — he, also, gathering his children together — and how those white sarcophagi — towered and belfried, each with his companions of living dead, gleam still so multitudinous among the mountain pyramids of the fairest countries of the earth: places of silence for their sweet voices; places of binding for their faithfullest hands; places of fading for their mightiest intelligences; — you may, perhaps, feel also, that so great wrong cannot be lovely in the near aspect of it; and that if this very day, at evening, we were allowed to see what the last clouds of twilight glow upon in some convent garden of the Apennines, we might leave the place with some such horror as this picture will leave upon us; not all of it noble horror, but in some sort repulsive and ignoble." Granted that the contemporary public found, not unjustly, that the figures in this picture were "frightful," — most people who saw it at the Grosvenor Gallery and at the Guildhall some few years ago admitted that it had the qualities of a pure and right sentiment, and an exquisite harmony of color. Millais probably exaggerated the plainness of the ordinary, natural, work-a-day nun, in his revolt against the silly, weak, and up-turned faces of the conventional nuns of his contemporaries; such women as would never have had sufficient strength of will to take to a conventual life; and after all, truth, if ugly, in art, is better than falseness and lying, however "sweet" and "pretty" they may be represented. Truth to nature was the cardinal virtue which the Pre-Raphaelites thought the aim and end of all art; that they sometimes fell, through good intentions, into falseness of another kind, simply proved them to be fallible, like the Impressionists of our own time. Such movements are necessary to the perfecting of art, and all lesser minds owe a debt of gratitude to the pioneers, who may, personally, be somewhat mad and extreme in their views.

That we all owe an enormous debt of gratitude to Millais for purging English art from maudlin sentimentality, is as certain as that European art has gained equally by the more modern Renaissance worked out by Manet, Bastien-Lepage, Dagnan-Bouveret and their followers. It has been said that *rien n'est vrai que le Beau,* but a truer motto would be, *Nothing is beautiful but the True;* and that was the end and aim of Millais and his Pre-Raphaelite friends. That the great master has worked upon those lines all through his career, no one can deny — his life has been one long search after truth; and herein lay his power of influence over a whole generation of painters. He moved on and developed his *technique,* but his art was always equally true; even when he pandered to popular taste, the pity of it was not on the score of want of truthfulness. As a master of the brush, he was the greatest that our country has produced during this century; as a colorist, he rarely erred. His art was robust, strong, healthy and, generally, happy; imaginative at times; poetic, rarely; wanting sometimes in refinement and culture, but never, intentionally, vulgar. A fashionable painter cannot always dictate to a lady-sitter what she should wear, or desire her to dispense with the enamelling which usually hides the natural charms of her face; moreover, would the portrait be true without the war paint? Yet, one would imagine, most people would be

[1] Exhibited 1855.
[2] Exhibited 1868.
[3] "*Notes on the R. A. Exhibition,* 1868," by W. M. Rossetti.
[4] Exhibited 1868.
[5] Turner, for example.
[6] Exhibited 1859.

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willing to dispense with this sort of truth to nature — flesh, with all its variety of tones, is surely more beautiful than *poudre de riz;* still, if the end and aim of faithful portraiture be a faithful representation of the man — or society lady — portrayed, we must, forsooth, human nature being what it is, reconcile ourselves to powder, paint, wigs, excess of jewelry and ornaments.

An exhibition of the artist's works, all that could be gathered together at the time, was held at the Grosvenor Gallery in 1886, and then one saw how temperament had been the handmaid of his artistic genius; for the guiding spirit of his work was confidence in himself. Whatever he painted, and however he painted, he always felt, for the time being, that he was right. Nature was his guide, but it was Nature as seen through his own spectacles. Think only for a moment, of the distinct styles of the "Huguenot," the "Eve of St. Agnes," and the "Portrait of Cardinal Newman"; and yet, from the point-of-view from which he started, they are all equally true to nature.

His first wonderful picture, "Isabella," was painted in 1849, when he was only twenty years of age. Then came the much-abused "Carpenter's Shop," in 1850, which may be looked upon as the forerunner of the modern realistic religious school, led by M. Lhermitte, M. Béraud, Mr. Hitchcock and others. In 1851 "Mariana" and the "Return of the Dove to the Ark." In 1852, the "Huguenot" and "Ophelia"; "The Order of Release," 1853; "Sir Isumbras" 1857; the "Black Brunswicker," 1860, exemplifying one of the painter's faults, that of repeating a success; for, as composition, the "Huguenot," "The Order of Release" and the "Black Brunswicker" are as much akin as the "First Sermon" and "Second Sermon," and others of the "pot-boiling" class. The "Eve of St. Agnes" appeared in 1863; "Rosalind" in 1868; "The Gambler's Wife," 1869; "Hearts are Trumps," 1872; "The Northwest Passage," 1874; the "Yeoman of the Guard," 1877. These are the most notable of the earlier pictures and most of them were at the Grosvenor; the total at that exhibition amounting to 159 pictures, out of the 228 which had been painted up to the year 1886.

S. Beale.

THE SKETCH-BOOK.[1]

SOME fifty years ago an English architect won, in open competition, the honor of building a church in a German seaport. In the preparation for his design he studied on the Continent innumerable buildings which he considered would train him in the style he should adopt. To be sure, in a German building it was excusable that he should wish to be German, and it is therefore not wholly to be regretted that he made Germany his field of study. But the reason of it is almost beyond our modern intelligence; it is hard nowadays to realize that this architect did not understand till three years afterwards that France, not Germany, was the real cradle of Gothic ecclesiastical architecture. The architect was no less a man than Sir Gilbert Scott, who paid his first visit to the French cathedrals *after* his appointment as restorer at Ely. Scott had built a matter of eight churches and carried out three restorations before he made that simple pilgrimage to the great churches of France which many a lad now takes in his pupilage. This goes to prove that even as recently as half a century ago the difficulties of scanty records were infinitely increased by actual doubt, even among the professors of art, of the right sources to which to look for inspiration and teaching.

In Street's time such difficulties were less, but with him, also, his own sketch-book and his own memory were his standards of reference. What a sketch-book his was too, and what a memory!

In those days there sprang up the duty of sketching as a means of record. It became a duty on the part of architects, young and old, both to travel and to sketch, and in sketching to make faithful memorandum of what they studied and what they saw. The duty, at least in that special aspect, is now practically gone. You can hardly visit a building of beauty anywhere in Europe without the discouraging sense as you pull out sketch-book and pencil that all you see before you, and every detail of it, has been already recorded and published, and probably much better drawn than you can draw it yourself.

Here, then, we face the questions, what is the need of sketching, and what is the good of travel? The bookshelves of any good office, or failing them the Library at Conduit Street, will afford you the opportunity of studying, comparing and committing to memory any building of importance in any country or of any age; why, then, should one travel a few hundred miles to make an inferior copy in one's own sketch-book or study these things under less comfortable circumstances? The man who could seriously ask this question could never arrive at, could never understand, the answer. It is, of course, the fact that our many and accessible records have made study a thousand times easier, and have rendered possible as never before the science of *comparative* archæology. Nay, further, these ready helps have made it no unlikely thing that a man should become even expert in the architecture of a country he has never visited: certainly it is possible for a student to have knowledge, and real knowledge, of more than he can ever even attempt to see with his own eyes and draw in his own sketch-book. But is the sketch-book therefore to die? Never, and for these reasons: Primarily, because in architecture the pencil works with the brain, and the brain with the pencil. To draw is to learn. It is impossible to learn architecture without drawing; it is impossible to draw architecture without learning. You can draw from engravings and photographs, of course, but that is a lifeless sport at which Nature revolts, and you have to reckon with human nature even in an architect's fibre. Again, there are more things in a building than the best book can give you. We are saved the necessity of visiting all buildings, but we must visit some at least and we must draw some. The resources of other men's labors, engravings, lithographs and photographs have brought us much; they have taken away the need of sketching as a means of essential record, but they have not killed the sketch-book — rather they have given the sketcher a new scope and a glorious liberty — a liberty which no man should abuse. So long as you draw — and draw you must — you may now draw what you will. Some of the necessity has gone, but none of the duty; and duty has its laws. Here are some of the guiding lines: Never draw to make a pretty sketch-book — Burges taught us that. Of two subjects, never choose the easier because it is the easier. Draw what you think you cannot remember rather than what you can. Never be timid, and, above all, draw whatever you admire. Such are the rules we glean from the direct teaching, and still more from the indirect example of those who have been and are the great masters of that magnificent and most modest art, the art of keeping an architectural note-book.

The young man of to-day who visits for the first time some famous building is relieved from the necessity of making anything like a complete record of it; but this should not by any means lighten his conscience of the duty of carrying away in his own mind, aided by his sketch-book, such memoranda as will enable him in imagination to reconstruct what he has seen. The practice of entering a cathedral and gleaning from it just so much as will provide a few pages of tasteful sketches is of course utterly reprobate. No doubt that man will learn most who on his first visit to the building draws nothing, but endeavors to absorb much. If on leaving the building he will attempt to put together on paper the general outlines of what he has seen, and on his second visit corrects the mistakes of his rough sketch, and fills the inevitable *lacunæ* by fresh observation, he will then have learned much — far more, indeed, than if he had spent his first half hour in making jottings of gargoyles or drawings of foliage. In buildings such as cathedrals, where plan is of importance, the plan should certainly be noted carefully, and rough general sections are by no means to be despised. They are not pictorial, and they do not interest the lady friends who look through your sketch-books, but they give the key to many a building, and they are as a rule sadly neglected by sketchers. Many men need to be reminded that there is a class of drawing which lies between the strictly measured drawing and the purely freehand sketch which is of infinite practical value. A record of the leading dimensions and an approximation of the main proportions can often be obtained when time does not allow of measuring in the usual sense. Notes of this kind, even if they be burned as soon as made, will put more knowledge into a man's brain than the execution of volumes of pretty bits or whole sheaves of water-colors.

Briefly, our new position comes to this. We shall soon have no need, except in rare cases, to store up records for others, nor even for ourselves. Our process in drawing will be the same, accurate as ever, careful as ever, but for a changed purpose. We shall sketch, in fact, for the training of our hands, the strengthening of our memories, and the cultivation of that nameless and indefinable faculty which is the mainspring of art.

[1] Portion of a paper by Mr. Paul Waterhouse, published in the *Journal* of the R. I. B. A.

OLD LOMBARD AND VENETIAN VILLAS.[1] — III.

CASTELFRANCO, October 5. — If one has long been under the spell of Giorgione, feeling the charm, the mysterious magic of this man's personality acting even in the works of others, and beckoning to one, with sighs so often delusive, from one masterpiece to another (the "Concert," the "Three Ages of Man," for instance, which are now proved to be Titian's), nay, from work to work of lesser, sometimes least great, masters, Catena, Bonifacio, Cariani, nay, wretched Schiavone. When the mere name Giorgione has grown a spell and a riddle one feels strangely moved as one enters his birthplace, as one stands before the curtain which covers his only signed and documented work.

The picture hangs in a whitewashed modern-looking little church: a great altarpiece, with the Virgin enthroned on a brocaded daïs, against the usual landscape, St. Francis and a young knightly saint holding guard. There are no singing angels, as is usual with Venetian pictures of this sort — "majesties" they are briefly called in Umbria; but the picture, once it lays hold of one (for, like all Giorgione's, it has nothing catching about it), seems painted to the sound of grave and buoyant music, and to emanate music all round. On the back of the canvas are scrawled the only words which still remain in Giorgione's hand, — a rude verse calling on his beloved, whom he names by name, Cecilia. Was this Cecilia the woman who, in some mysterious manner, plague or jealousy, caused his death, and, stranger thought! was she that enthroned Madonna?

One is glad that it should be at Castelfranco, for the place is worthy to hold it. It is a charming little town, or two towns, rather,

[1] An article by Vernon Lee in *Cosmopolis.* Continued from No. 1080, page 79.

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one within the other, still in the plain, but with the green hills of Asolo, the far-off blue dolomitic peaks beyond. The church containing the picture is in the inner town, surrounded by a moat-like river, and by walls and towers (the main tower with the winged lion) of delicate pink brickwork, grown with ivy and caper flowers. The very inn is of the old days, Venetian, with pillared and lioned balcony, above which creaks the sign of a gigantic sword; it was standing, most probably, before the birth of "Big George, of the March Burgh" — Giorgione di Castelfranco.[1]

Villa M——, between Treviso and Mestre, October 7. — Dusty roads bordered with plane trees and little canals, barely visible in the twilight; a long avenue as the stars begin to come out, and the lights of a long, low, Venetian house shining orange in the blue night as we drive up, among the hum of crickets and the gusts of *olea fragrans* and ripe American grapes. After dinner the whole big family gathered round the majestic and gracious mother[2] in the long room, hung round with the portraits of senators in purple and admirals in steel; ancestors who may look down without sorrow on this houseful of vigorous, active sons — soldiers, sailors, farmers, not an idle one amongst them, even as in the old days of Venice. The daughter goes to the piano and plays a lot of quaint old minuets and gavottes. But why nothing by the great-great-grand-uncle? Why, he was the greatest composer Venice produced, and one of the greatest of the great days of Bach and Handel. "He was also," remarks one of the sons, "an excellent official of the Serene Republic, and gave great satisfaction here on the mainland and in Dalmatia, where, as you know, he died."

Venice, October 10. — Here our journey has come to an end; our journey from friendly house to friendly house, even as in the old times.

Of those days on the mainland — among those famous villas where the voluptuous Venetians once took their pleasure — I must note down, while it is fresh, the impression of the ghostly coach-houses of the Morosinis at Matelágo.

We went there to see the vintage, which, for the rest, was raging all round. Before the farms — those low, long Venetian houses with funnel-shaped chimney — men were treading the grapes with reddened legs, and unharnessing the bullocks bringing ever new vatfuls. The vast, cool entrance-hall of that Morosini villa (once of the Grimanis, and now, alas! of a score, literally, of impoverished coheirs and heiresses) was filled with the finest musk grapes on mats, and more were spread on the grass before the door, watched over by the allegorical goddesses which the pupils of Veronese once painted on the house front. Below, extend an endless suite of cellars, dark, cool, where bare-legged men were hurrying to and fro with wooden crates of fruit and copper pails of new wine, vats looming huge on all sides (the big ones holding some two thousand litres!), the air becoming, as you go farther, more and more heavy with fumes of must. In the midst of the cellars a cross reaching to the great rafters, pincers and hammer and spear black in the gloom. Here, in the great day when men were rich, and grapes still ignorant of diseases, the Morosini, or Grimani chaplain, descended with torches and banners, to bless the new-made wine. Even in these times of phyloxera and peronospora, and kindred vine plagues, the fumes in that cellar were more than our Northern heads could bear; and we speedily fled upstairs into the granaries, where the grain and maize lay in bronze and golden heaps. On we strolled, till the granaries turned into buildings, as vast and as endless, but filled — not with corn, not with vats, but with every conceivable sort and shape of vehicle. Every sort and shape, that is, which was known in the eighteenth century; not one modern wheeled thing among them all.

There was a wonderful emblazoned wedding coach, and a travelling coach on high leather C-springs, poised on wheels five feet high, which had brought a Morosini's bride from Vienna a hundred and many years ago. By its side huge wagons for carrying the servants, and still containing, intact, it is said, an entire *batterie de cuisine!* And more melancholy and stranger, a fantastic melon-shaped chaise, with the trunks still in their place and the bottle-shaped lamps — lighted last, who knows when? — ready for use.

Strange, silent, motionless things, once so noisy with wheels and bells and postillions, whip-cracking and horn-tooting, once so solemnly stately in roll, or so nimble in swinging rattle! Could we mount into one of them, some night of waning moon, as the must-fumes rose heady from the cellars of Martelágo, would not witch-horses, bred of the winds and clouds that scour the lagoon, harnessed by ghostly grooms and driven by ghostly postillions, carry us also into distant parts, into the far-off places where the dead Venetians still hold revel?

[1] Mr. Ruskin, in a famous passage, translates *Brave Castle*. But Castelfranco is a common name for boundary places.

[2] Alas, now no more. 1895.

BOOKS AND PAPERS

THE accumulation of literature on technical and art topics has of late years become so vast that any one may feel confident that an account or explanation of the fact or theory that interests him has been published already by some one in book, pamphlet, magazine, or periodical and should be within his immediate reach. Unfortunately, matter of this kind is distributed by its authors in a most unscientific way through many publications, and the editors of periodicals are anything but precise in the classification of the matter they accept for publication, so that an investigator does not and cannot know with certainty just where to turn in search of the information which he rightly assumes must exist somewhere. If search amongst the most probable sources of information reveals nothing, he must abandon the effort, unless chance brings to his hand the article he needs, practically concealed in some medium where he would not naturally think of looking for it.

To minimize this evil and in some sense to take the place of coöperation between the editors of periodicals, the attempt has been made in this and other countries to publish topical indices of papers on matters of interest and importance that have been published in the leading and standard magazines and periodicals, crediting to its author each paper indexed and giving the title and date of the periodical in which it appeared.

For ten or a dozen years the *Journal of the Association of Engineering Societies* has published from month to month such an index, giving not only the bald fact of publication, but also a concise statement of the purpose and result achieved by the writer, this work being directed by Prof. J. B. Johnson, of Washington University. This work has been done by a purely professional journal and purely in the spirit of profiting the profession which maintained the *Journal*. But during the last few years the publishers of the *Engineering Magazine* have been conducting — as a profitable and money-making feature of their publication — an index of essentially the same kind which, to a large degree, duplicated and made unnecessary the index as published in the *Journal*. The result has been that the elder periodical now abandons to its contemporary this useful undertaking and has turned over to it the plates ready for the publication of its second completed volume, which covers the years 1892-5, and the publishers of the *Engineering Magazine* have now issued this matter, in a book[3] of some five hundred pages, bound in cloth, and will continue the index monthly in their own publication, republishing in bound form from time to time.

The value and labor-saving advantage of such an index of fugitive but valuable records are beyond dispute and these bound indices would form a valuable addition to the library of any engineer and many architects, but we hope that future issues may be arranged on some system which does not require one to consult a key in the preface before he can discover the proper way to use the book.

To our mind there is no more popularly useful index than one that conforms itself strictly to the simple alphabetical arrangement and it seems to be a great and incurable defect that in this volume this simple line of procedure has not been strictly adhered to. When one who is interested in dams has run his eye down the page from "Black Eagle" to "Vyrnwy," he has a right to feel that he has got to the end of his search, but with the expenditure of a little more time he discovers that this curious index continues, page after page, giving titles of other dams arranged after no perceivable method of indexing, "Austin" following "Perigar" and "Bonzey" succeeding "Titicus," till he feels like changing his noun into a similar sounding verb and applying it vehemently to "such an index as this."

[3] "*The Engineering Index*." Vol. II. 1892-5. Edited by J. B. Johnson, C. E. New York. Published by the *Engineering Magazine*. 1896. Price in cloth, $4.00.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

STATUARY HALL, FORMERLY THE HALL OF REPRESENTATIVES, U. S. CAPITOL, WASHINGTON, D. C. BENJAMIN H. LATROBE, ARCHITECT.

[Gelatine Print, issued with the International and Imperial Editions only.]

THIS plate forms one of the series illustrating Mr. Brown's papers, now being published in this journal, on the National Capitol.

HOUSE OF W. M. WARNOCK, ESQ., EDWARDSVILLE, ILL. MR. F. C. BONSACK, ARCHITECT, ST. LOUIS, MO.

"THE MOUNTFORT," CORNER BEACON AND MOUNTFORT STS., BOSTON, MASS. MR. C. E. PARK, ARCHITECT, BOSTON, MASS.

HOUSE FOR J. S. FLOWER, ESQ., DENVER, COLO. MR. WM. COWE, ARCHITECT, DENVER, COLO.

INTERIOR OF THE NEW GREEK CHURCH, RUE BIZET, PARIS, FRANCE. M. EMILE VANDREMER, ARCHITECT.

CIRCUMSTANCES prevented the publication of this view in the same issue (Aug. 15) in which a description of the building was printed.

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UNSUCCESSFUL COMPETITIVE DESIGN FOR ST. PAUL'S CHURCH, ROCHESTER, N. Y. MESSRS. CRAM, WENTWORTH & GOODHUE, ARCHITECTS, BOSTON, MASS.

We hope, sooner or later, to be able to exhibit to our subscribers the design of Messrs. Heins & LaFarge to whom the competition was awarded.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXVIII: MUSIC PAVILION IN THE PARK OF THE PETIT TRIANON, VERSAILLES, FRANCE.

OLD COLONIAL HOUSE ON LONG ISLAND. DRAWN BY F. B. NOLAN, 1896.

GROUP OF THEATRES.

[Additional Illustrations in the International Edition.]

SIDE ENTRANCE TO THE NEW MARKET-HOUSE, DRESDEN, SAXONY. HERREN RETTIG & FISCHER, ARCHITECTS.

[Gelatine Print.]

We desire to call attention to the fact that the printer has blundered in printing the date and number upon this plate.

PORTAL OF SAN MIGUEL, SARAGOSSA, SPAIN.

CANTERBURY CATHEDRAL, AFTER A DRAWING BY MR. BERESFORD PITE, ARCHITECT.

This plate is copied from the *Builder*.

HALL OF THE DRAPERS' COMPANY, LONDON, ENG.: THE STAIRWAY.

This plate is copied from *Building News*.

MONUMENT TO BOUCHER, IN THE GARDEN OF THE LOUVRE, PARIS, FRANCE. M. AUBÉ, SCULPTOR.

This and the following illustration are copied from *La Construction Moderne*.

COMMEMORATIVE MONUMENT AT PUY, FRANCE. M. PROY, ARCHITECT.

CAIRNS CHAMBERS, SHEFFIELD, ENG. MR. CHARLES HADFIELD, ARCHITECT.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

JOHN HENRY PARKER.

Denver, Col., September 2, 1896.

To the Editors of the American Architect: —

Dear Sirs, — I wish to ascertain the year in which Mr. John Henry Parker, author of the "*Glossary of Architecture*," died. I think it may be found in "*Gwilt's Encyclopedia*," but there does not appear to be a copy of the book in Denver. If any of your readers can give me the date, I shall be greatly obliged. The date given in my pocket-book is evidently an error.

Yours truly, F. E. Kidder.

[John Henry Parker was born in 1806 and died January 31, 1884. — Eds. American Architect.]

NOTES AND CLIPPINGS

Aluminium in Glass-making. — Aluminium is destined to play a prominent part in glass manufacture in the opinion of M. Léon Appert, a French glass expert. From numerous analytical tests of ancient window glass he has reached the conclusion that glass modified by the introduction of aluminium is more solid, less changeable, and more elastic. The aluminium can be added up to a proportion of 7 or 8 per cent without any inconvenience. The fusibility of the glass is slightly increased, while its ductility is not sensibly diminished. The only disadvantage of the aluminium glass is that it may be slightly colored by the iron oxide when the aluminium contains an impurity. — *Invention.*

The Dinner-hour and Thirteen o'Clock. — One of the features of Trafford Park is the clock-tower, or rather the clock itself, which has the peculiarity that it strikes thirteen when all other clocks in Manchester are striking one. It appears that, one day, the father of the present Baronet noticed that the haymakers were still idling over their dinner at quarter-past 1 o'clock They declared that they had not heard the clock strike. Sir Humphrey retorted that they should not have any excuse of this character in the future, and from the following day forth the close of the dinner-hour was announced by thirteen strokes of the clock. — *Marquise de Fontenoy in the Phila. Press.*

The Sainte Chapelle, Paris. — Some critics have claimed that of all the churches of the Middle Ages in France the most perfect, that which shows on the part of the architect the highest amount of talent, is the Sainte Chapelle at Paris, for that church keeps a perfect stability without the aid of flying-buttresses; and starting from this point, the same critics, happy without doubt at having made this discovery, have added: — "The flying-buttress, a permanent stone support, exposing the weakness of the builders, is thus only a barbarous overgrowth, a useless toy, since even during the Middle Ages skilful artists knew how to do without it." The argument is forcible, but the Sainte Chapelle has no aisles, and at the start the architect was not obliged to cross that space and transmit the thrusts of the great vaults outwards beyond those aisles. It is thus, nevertheless, that people nearly always talk of an art that they do not understand and the multitude applaud, for the professionals do not think it necessary to refute such arguments. They are wrong, for an error repeated a hundred times even by the most ignorant, but repeated with assurance, ends by being admitted among the most undeniable truths; and we still see printed to-day in perfect good faith on the subject of the arts, and especially upon Gothic architecture, arguments long since refuted by the criticism of facts, by history, by monuments and by demonstrations based on geometry. All this labor of truth which seeks to assert itself passes unperceived before the eyes of certain critics, who probably boast that they forget nothing and learn nothing. — *The Architect.*

Is the "Sistine Madonna" a Replica? — Are all visitors to the Engadine aware, we wonder, that the proprietor of one of the hotels at St. Moritz — Mr. Caspar Badrutt — is the happy possessor of an admirable replica or early copy of Raphael's most famous picture, the "Sistine Madonna"? We have said "a replica or early copy," but Mr. Badrutt himself boldly claims his as the original work and the Dresden picture as the copy. A handsome folio, setting forth his case and giving photogravures of the two pictures, has recently been published at Zurich. A complete history, with many curious details, of the St. Moritz picture is also given. It was originally in the possession of Alfonso, Duke of Ferrara, and was bought by Mr. Badrutt's father from a house in Reggio, in the Emilia. In 1887, he sent it to Herr Sesar, in Augsburg, to be restored, and it is now for the most part in good condition. Mr. Badrutt bases his claim for this as the original on certain doubts and difficulties about the Dresden picture which have always exercised the art historians. Thus: Vasari's account is so inaccurate in many particulars that it may be inaccurate in all. How were the obscure monks of San Sisto, in a small town like Piacenza, able to secure a great masterpiece by Raphael at the very height of his fame? Why did Raphael paint it (alone among his works) on canvas — and on coarse canvas, too, with two cross seams? Mr. Badrutt claims that Duke Alfonso was a more likely purchaser, and that he commissioned the work as a processional banner to be carried in the coronation procession of Pope Leo X. And his — the St. Moritz picture — is painted on one piece of the finest and strongest damask linen. All this is somewhat in the air; and unless, or until, further documents are discovered, the relative position of the two works must be decided by internal evidence — and, tried by this evidence, we doubt if the Dresden Madonna has anything to fear. — *The London News.*

Dutch Influence on English Gardens. — The Dutch influence grew strong with the advent of William III, and left its mark on many a garden and park. Topiary work was carried to excess; fountains came still more into fashion, and the knotte was replaced by the parterre, "furnished with greens and flowers," or "cut out curiously," as Hanmer tells us, "into embroidery of flowers and shapes of arabesques, animals, or birds, or feuillages." Gardens were laid out of much larger size; attempts were here and there made to get still further away from the old formality, and a desire to see beyond the confines of the garden was evinced that was destined before long to alter its character altogether. So large were many of the new gardens that their owners found it no longer possible to keep them trim and neat. The gardens of the Duke of Montague, in Northamptonshire, covered more than 100 acres, and others were laid out of from 50 to 80 acres. The avenues in the park were planted so as to fall in with the plan of the garden; and the straight walks of the garden, which belonged especially to Queen Anne's time, were edged with trees, kept clipped, so that the eye might be led to some distant point in the park beyond. But while clipping thus remained in fashion, people grew tired of the hedge and the alley and turned their attention instead to clipping single trees and shrubs. To such an extent was this carried that it became at last ridiculous. Many turned it into fun altogether, and Pope's satirical remarks on "the verdant sculpture" of the period shows how the custom was regarded in some quarters. An artist puts out a catalogue of his productions, the same being offered for sale: "Adam and Eve in yew, Adam a little shattered by the fall of the Tree of Knowledge in the great storm; Eve and the Serpent very flourishing. St. George in box, his arm scarce long enough, but will be in condition to stick the dragon by next April; a green dragon of the same, with a tail of ground ivy for the present (N. B. — These two not to be sold separately). Divers eminent modern poets in bays, somewhat blighted, to be disposed of a pennyworth. A quickset hog shot up into a porcupine, by its being forgot in rainy weather." — *The Quarterly Review.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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SEPTEMBER 19, 1896.

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AS a reply to the charges made against the New York Superintendent of Buildings, a petition, signed by one hundred and sixteen of the most distinguished architects, and firms of architects, in the city has been presented to Mayor Strong, commending the manner in which the business of the Department has been conducted under his care, and asking that the appropriation for its expenses may be increased, in order that its efficiency may be still further promoted. Whatever may be the result of the Mayor's reflections on the various representations made to him, Mr. Constable will always have reason to be proud of the cordial endorsement of his course thus made by the profession which can best understand the difficulties with which he has had to contend, and the importance of the reforms that he has introduced into the administration of his responsible office.

ONE of the most ardent and self-sacrificing of the distinguished men of science who have made the Smithsonian Institution an honor to their country, Mr. G. Brown Goode, Assistant Secretary of the Institution, and Curator of the National Museum, died recently, regretted by every American who interests himself in the sciences which the Smithsonian Institution has served so well. While Professor Henry and Professor Baird, by their admirable comprehension of the sphere that the Institution should fill, and the efficiency with which they employed its resources, brought it, in a generation, to the first rank among national institutions of learning, Professor Goode took for himself the no less important work of establishing and putting in order the great National Museum connected with it. A more difficult task could hardly be imposed upon any one. Unlike most museums, which are built up slowly, by acquisitions carefully selected by a council of experts, the National Museum was, one might say, formed at once, out of a chaos of objects, related to nearly every department of knowledge, and piled in a heterogeneous mass in the Museum rooms. In this mass were many objects of great interest and value by themselves, and many more which could acquire great interest and value by proper correlation with others; and it was the duty of Professor Goode to manage this correlation in such a way as to give to each object its utmost possible scientific value. How well this task was accomplished, every visitor to the Museum can testify; but few of those who have felt the charm of its instructive and apparently simple disposition can comprehend the learning, as well as the breadth of scientific view, which guided the arrangement. It is a satisfaction to think that the work which he began so brilliantly has been left in able hands, and the traditions of the Smithsonian Institution are not likely to lose their lustre in the keeping of the surviving members of this most precious branch of the public service.

M. TRÉLAT, the Director of the École Spéciale of Architecture in Paris, an institution which maintains the idea of the advantage of originality in architectural design, as distinguished from the copying of traditional patterns which is supposed to characterize the methods of instruction in the Government School of Fine Arts, has a way of inspiring his pupils by setting them to design things in which they can take an intelligent interest, and which they will be disposed to clothe with architectural forms out of their own consciousness, instead of copying what some one else has done before them. Not long ago, on the occasion of an important competition in the School, he assigned for a subject a design for a "Residence for the President of an African Republic of the Second Rank." Then, in elucidation of the theme, he related what was evidently the story, thinly disguised, of the rise of the Transvaal Republic under President Krüger. What success the class obtained in its competition, we are not informed, and it seems to us that the task of expressing in architectural forms the peculiarities of the fierce Calvinist peasants of the Transvaal, and their hard-headed old President, would be far beyond the capacity of any students of our day; but the idea of exciting some original movement of the imagination in students is of the greatest value. The difficulty is to interest them in a subject modest enough to be really within their powers. We should say that some such theme as a "Drinking-fountain for Lions," to be erected in the desert at the expense of Tartarin of Tarascon; or a section of the court-yard in the Castle of the Giant Despair, or one of the gateways of the Celestial City, would be enough to tax the powers of any one; and it is reasonable to suppose that such problems would, as M. Trélat seems to think, not only develop the imagination, but serve as an admirable test for distinguishing students of real artistic capacity from the clever borrowers of other people's ideas.

WE have received the third number of the *Baumaterialienkunde*, a fortnightly journal, devoted to information on the uses and tests of building materials, and published by Stähle & Friedel, Tübingerstrasse, 57, Stuttgart, Germany, at fifteen marks per annum for the Postal Union. This journal, which is edited by Professor Giessler, of Stuttgart, is the official organ of the International Association for the Testing of Materials, and a portion of its space is regularly devoted to reporting the proceedings of that Association, the rest being occupied by technical articles and essays, and miscellaneous intelligence. The official portion is printed in German and French, in parallel columns; the remaining articles are in French or German, as may best suit their authors. Among the French articles in this particular number is one of much interest on the setting of Portland cements containing sulphate of lime. Of course, normal Portland cement should, in theory, contain no sulphate of lime, but the slag cements, some of which are of very good quality, would naturally contain it, and it is said that it is added, in the form of plaster-of-Paris, to certain Portland cements after burning. However it may enter the mixture, the sulphate gives some curious properties to the cement. Among these is the inconvenient one that a cement which, while fresh, sets slowly, requiring perhaps six or eight hours for solidification, may, if kept for several weeks or months in a bag, or barrel, become very quick-setting. The author of the article, M. E. Candlot, of Paris, says that a sample of cement, kept for one month in a keg, closed with a cork, required six hours and twenty-five minutes for setting. After keeping for five months, it would set in eighteen minutes.

WE will not follow M. Candlot into all the chemistry of this phenomenon, which, as he says, depends upon the fact that aluminate of lime will not dissolve in water containing hydrate of lime. All fresh-burnt Portland cement contains hydrate of lime, which dissolves out at once when water is added, and prevents the aluminate of lime from dissolving and combining with the lime sulphate, which dissolves in the water together with the hydrate. After several months of keeping, the pure hydrate in the fresh cement becomes converted by the action of the atmosphere into carbonate of lime, which is insoluble in water, and hence does not hinder the solution of the aluminate; so that, on tempering, the latter quickly dissolves in the water, and combines with the dissolved sulphate to form the crystals, to which the setting action is due. A proof that this is the true explanation of the matter is to be found in the fact that a cement which has become quick-setting by long keeping may be made slow-setting again by the addition of a little hydrate of lime. Used in water, the cements containing lime sulphate, if used fresh, and plunged

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into water immediately after setting, curl and crack at the edges of the cakes. If the cakes are kept in air for twenty-four hours after setting and then plunged in water, the fissures do not appear; and cement which has been kept for some time may be used under water immediately after setting, without disintegrating.

AN interesting observation which is made in regard to cements which are very quick-setting when fresh, is that they often become slower-setting by exposure to the air. Certain Portland cements, when fresh, set in less than one minute. Such cements can hardly be used on the first set, for they do not allow time enough to mix them, and the consequence is that the workman, in tempering them, breaks up the first set, leaving the cement to act by its second set, which is, as every architect knows, deficient in strength. For detecting cements of this sort, and, in general, to distinguish fresh cement from that which has been retempered after its first set, M. Candlot points out that the retempered cement is much "fatter" and more plastic than fresh-mixed cement, and that a mass of it retains its consistency, instead of settling slightly, and throwing out a film of water, as Portland cements always do when setting normally. Cements found to set very quickly, especially if they contain sulphate of lime, should be carefully treated, exposing them to the air for several weeks, to lengthen, if possible, the time of setting, and keeping work made with them for twenty-four hours in the air, before exposing it to the action of water, in order to avoid scaling of the surface.

MOST people know that one of the Federal Statutes forbids the employment of workmen for more than eight hours a day in Government buildings, "except in case of extraordinary emergency." A contractor in Washington undertook to remodel a public school-house, and to have the work done by September 15, under a penalty of fifteen dollars a day for delay after that time. In order to complete his contract, the builder was obliged to ask his men to work more than eight hours a day, of course paying them for the extra time. Technically, however, this was a violation of the statute, and the contractor was arrested, tried by jury, and convicted of misdemeanor in so doing. The jury found, and with reason, that the fact that the contractor would lose fifteen dollars a day by delay did not constitute an "extraordinary emergency" which would justify him in violating the law, nor was he justified by the consideration that several hundred children would be kept waiting until the building was done; and he will undoubtedly have to suffer punishment.

OF course, the fact that a contractor for Government buildings cannot employ men at any price to work more than one-third of the day, and that the men are forbidden to use a part of their leisure time in earning money for their families, is a disgrace to American liberty; but the jury did not make the law, and their opinion that the evidence did not show such "extraordinary emergency" as the statute regards as justifying its suspension was unquestionably reasonable, and was much more creditable to them than an attempt to evade the truth, or give a perverted meaning to the statute, would have been. After the men have had occasion to reflect for a few more years upon the comfortable additions which they might have made to their income by a little extra work, and the public has reckoned up how much it has lost through the enforcement of a law procured by labor agitators with the direct purpose of discouraging independence, thrift and industry, it may be hoped that it will be repealed, and American citizens endowed again with the birthright in defence of which their fathers fought so bravely, — that of carrying on their affairs without interfering with other people, and without suffering other people to interfere with them.

THE kind of liberty which Nationalists and "labor-reformers" and single-taxers and socialists generally have in view for their fellow-men is well shown by the experience of Australia. Most people know that nearly all the Australian colonies have been for several years ruled by "organized labor." Being Anglo-Saxon communities, they have conducted themselves, on the whole, honestly and peaceably; but generations yet to come will groan under the burden which the wild experimenting of the "emancipators of mankind" has imposed upon their countrymen. In most of the colonies, the first proceeding of the leaders of the "workingman's party," on coming into possession of the Government, was to make "good times," by providing their constituents with employment. As they could not influence private owners to build more houses than they needed, they had recourse to public works, and town-halls, railways and similar works were planned on a great scale. As their constituents would hardly have liked to take out of one pocket in the form of taxes what they put into the other as the wages of their labor on the new public works, the money to pay for all these fine things was borrowed, mostly in Europe. The experience of taking in millions of dollars in exchange for bonds, and using the money to make business lively in the community, was so pleasurable to the party in power that it persisted in the process until the colonies were saddled with enormous debts, far larger, in many cases, in proportion to their population and resources, than those of any other country in the world. By-and by, some one called attention to the fact that the Australian colonies, with a population about equal to that of the State of Ohio, had a public debt of something like a thousand million dollars. After this announcement, Australian bonds began to sell more slowly, and there was much less money to distribute through the medium of public works. Employment for workingmen therefore languished, and the leaders applied the usual socialist treatment for this complaint, consisting in shutting out from employment everybody except their own constituents. The colony of Queensland, in pursuance of this policy, passed a law summarily prohibiting immigration, so that its citizens should have no reason to fear new competitors. This measure, apparently, was not remarkably successful in promoting the prosperity of the colony, for the other Australian communities do not seem to have imitated it. New Zealand, however, improved upon it. The men in charge of the Government, inspired by the works of Henry George, as it seems, instead of merely shutting out competing "struggle-for-lifers," as the French economists elegantly call them, conceived the idea of laying hands, to provide for their necessities, on the "unearned increment" which they saw around them. They appropriated bodily a large part of the unimproved land, and passed a law under which all large improved estates are subject to confiscation, at a value to be fixed by a special commission. For the purpose of distributing these new acquisitions among the people, they devised a system of "Village Settlements," under which twenty or more persons may associate themselves, choose a Board of Trustees, and receive from the Government a tract of land, of about one hundred and thirty acres, with a loan of two hundred and fifty dollars for each member of the Settlement, which must be repaid, with interest at five per cent, within ten years. The Trustees, under the statute, assign to each member a portion of the land for his use. If he dies, or resigns, or if the Trustees expel him, as they have power to do for such offences as "insubordination," "absence without leave," or "disobedience to the rules," his land, with all the improvements that he has made on it, reverts to the Settlement. So far, the system resembles that of the Russian "mir," or village community, but the New Zealand Settlement is governed with a minute tyranny, in comparison with which the Russian system is wild freedom. The Trustees direct the cultivation of all the land of the Settlement, and the erection of buildings; they decide what industries shall be established, and what each member of the community needs for his maintenance. No member can either sell or buy anything without the permission of the Trustees, nor can he undertake any labor outside the community. All labor within the Settlement is subject to the direction and supervision of the Trustees, who fix the length of the day's work, and impose extra hours of labor on such persons as they see fit to discipline in that way.

THIS sort of semi-military slavery, which, as the *Evening Post* points out, must be characteristic of all socialistic organizations, does not seem to suit, in practice, the Anglo-Saxon temperament. Last year, a Parliamentary investigation was made into the conduct of the thirteen Village Settlements then existing. All of these except one had, in a year and a half, exhausted their Government loan, and were borrowing more; robberies, fights and riots were frequent, and were unpunished; and the land was in some cases uncultivated, because the Trustees could not agree on the way in which it should be improved. Of course, the witnesses before the Parliamentary Commission thought that all would be well if they could only have more money bestowed upon them by the Government; but it remains to be seen whether the people who pay the taxes in New Zealand will take the same view.

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PUY-EN-VELAY.[1]

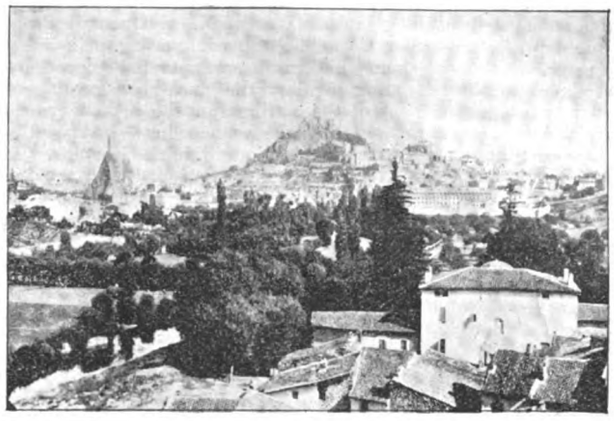
THE town of Le Puy has long been celebrated in the Christian world for its Église Angélique — one of those churches that, like Westminster Abbey, were, according to tradition, consecrated by the ministry of angels — but still more celebrated, perhaps, for its miraculous Vierge Noire carved out of setim-wood, says the poetic legend, by Jeremias of old in a season of prophetic enthusiasm during his exile in the land of Egypt, and sent, some say, from the East by Haroun-al-Raschid to the mighty Emperor Charlemagne. And the town itself is as strange and wonderful as the legendary history of the church and its Madonna. It is built over the extinct fires of a volcanic mountain, and in every direction are balsatic rocks and tall, isolated peaks that give the place a physiognomy apart. The approaches, too, are singularly beautiful. The railway from Brioude comes sweeping around a mountain bordered by columnar rocks into a large basin, formed by the union of three beautiful valleys watered by the Loire, the Borne and the Dolaison. This basin is encircled by bold hills riven into varied fantastic shapes by some awful force. At the east is Mount Anis, on the side of which stands "Puy Notre Dame,"[2] the favored city of Our Lady, rising from the fresh green valley, tier above tier, like an amphitheatre, with successive stages of convents, churches, donjons and private dwellings, its streets leading up in converging lines to the Angelic Church,



Le Puy-en-Velay, after a reversed etching by J. Pennell. From *The Yellow Book.*

which stands on a truncated cone at the foot of the Rocher Corneille — an enormous cliff of volcanic breccia that towers directly above, bearing on its summit the colossal statue of Notre Dame de France, cast out of the ordnance taken at Sebastopol. On all sides are the sharp volcanic cliffs that make Puy one of the most striking and singular towns in Europe.

On the right bank of the Borne as you approach the city is the Rocher d'Espaly — a huge basaltic cliff that stands isolated in the valley, its foot bathed by the river. On the top once stood a fortress erected for defence by the bishops of Puy and famous in the history of the province. Here Charles VI received notice of his father's death, and, though the greater part of his kingdom was in the hands of foreigners, was proclaimed king of France by a few faithful vassals of Languedoc come to take their oath of allegiance. This historic castle, where more than one king had been a guest, was in the sixteenth century besieged by the Routiers, the Huguenots and the Leaguers, one after the other, and totally ruined. Only a few crumbling walls remain of the ancient halls once made brilliant by knights in armor and courtly array, and graced by ladies of the train of Mary of Anjou. The view from these ruins is exceedingly picturesque. At the west is the charming valley of Bernarde between the dark, prismatic rocks so appropriately called the Orgues d'Espaly and another cliff, on which stands the Château de Ceyssac. At the south are the heights of Rouzon. At the north are rich uplands where you see Paradis, the establishment of the Brothers of the Christian Doctrine. But the finest view is at the east, where rises the mountain of Holy Anis, ascended by popes,

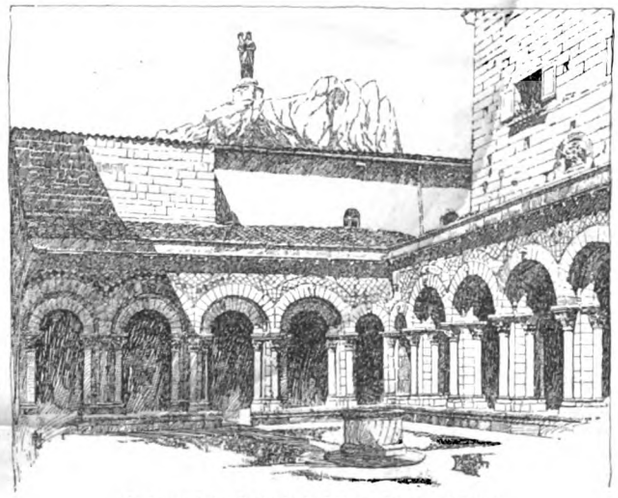


Le Puy, from the West.

emperors, kings, nobles and saint after saint, to pay homage to Our Lady of Puy enthroned above the town that sprang into existence solely to do her honor. At the foot winds the Borne through orchards and meadows, past the walls of St. Laurent, where Du Guesclin first found a tomb, and then around the tall, sharp Rocher de St. Michel, otherwise called the "Aiguilhe," or Needle, that rises nearly three hundred feet from the valley, looking like a jet of lava suddenly thrown up by some subterranean force and at once congealed. This lofty, precipitous rock stands in the suburbs of Puy and is one of the most striking features of the landscape. It seems to close the valley at the northeast, and hides from view another basaltic cliff crowned by the ancient castle of Polignac. Perched, as by enchantment, on the very top of the Needle is the seemingly inaccessible chapel of St. Michael, built in the tenth century on the ruins of an old pagan temple hewn out of the rock, where once were worshipped strange gods —

"Osiris, Isis, Orus and their train."

You ascend to it by means of steps hewn zigzag up the perpendicular side of the cliff, with a broader shelf here and there, on which once stood oratories to St. Gabriel, St. Raphael and St. Guinefort — an ancient martyr said to be the son of a Scottish king. The chapel on the top stands on a small esplanade surrounded by a parapet. It is much injured, but is interesting on account of the mosaic work and curious sculptures of both pagan and Christian times. And there are mysterious recesses and passages in the walls that formed part of the ancient temple of Osiris. The old statue of St. Michael the Archangel, that once stood like a Stylite on his column, was hurled down the precipice by the Huguenots when they sacked the chapel. They left the building in a ruinous condition, but the general effect has not been impaired, and its graceful outline against the pure sky, in perfect harmony with the richly-colored



Cloister of the Cathedral of Notre Dame, Le Puy.[3]

cliff on which it stands, is the admiration of every traveller. From the esplanade there is a fine view of Espaly on one side, the city of Mary at the south, beautiful villas in every direction, and on the

[1] Extracts from a paper by M. P. Thompson, published in the *Catholic World* for November, 1882.

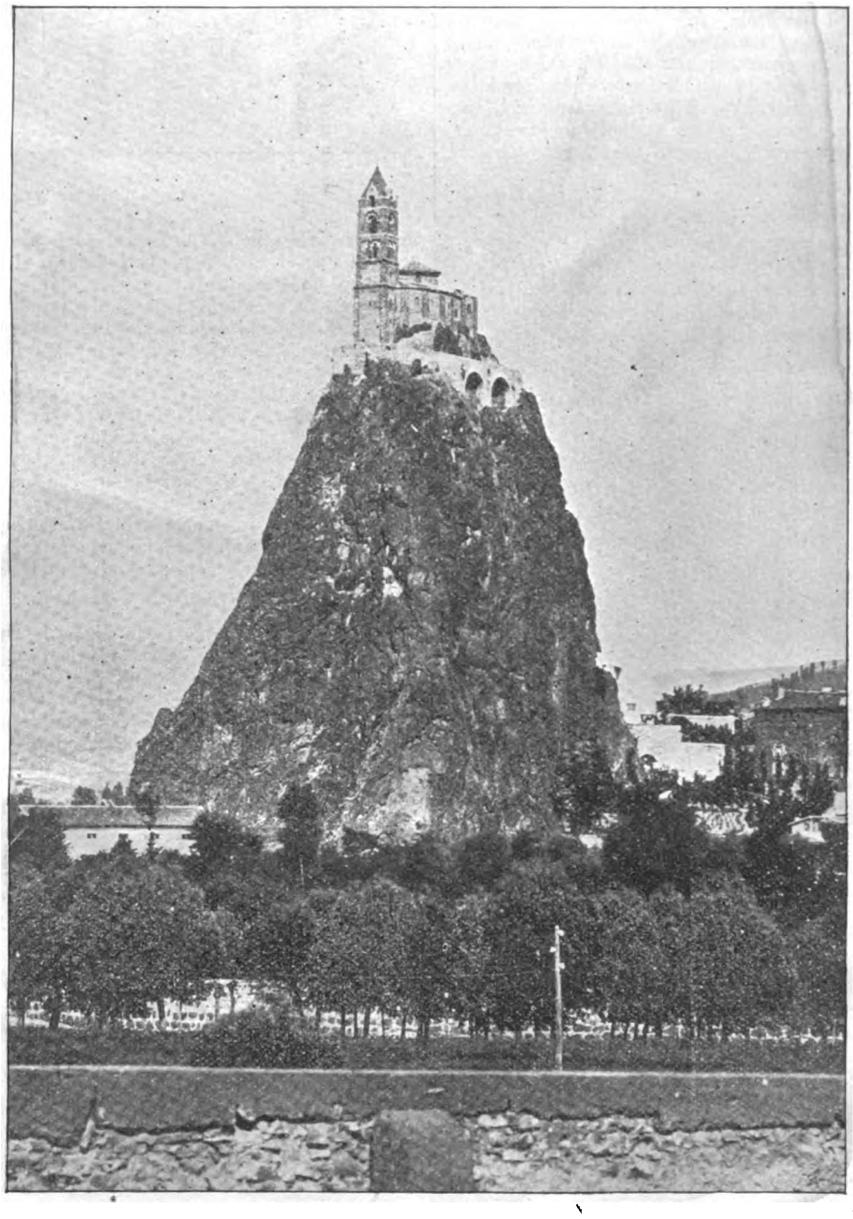
[2] Puy is derived from a Celtic word signifying a height or isolated peak.

[3] Another view of this cloister was published in the *American Architect* for September 3, 1892.

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horizon the mountains of Pertuis and Mezenc, and the crater of Bar.

When we arrived at Puy the afternoon sun had already disappeared from the valley, but it still lit up peak after peak of the surrounding heights; and as the train swept in a broad curve around the foot of Mount Anis, affording a magnificent view of the whole town and its environs, we were startled, as by a sudden vision, at the sight of the gigantic statue of Notre Dame de France on the top of the Rocher Corneille, the culminating point of the landscape, holding up her Child, as it were, to the adoration of the whole world. Standing against the dark-blue evening sky bathed in the golden glory of the setting sun, she looked, crowned with twelve stars as she is, like the woman in the Apocalypse clothed with the sun — a great wonder, indeed, in the heavens. The spire of St. Michel, too, on its lofty cliff was tipped with the same celestial fire. And seated majestically in mid-air at the foot of the Rocher Corneille, but in a graver light, was the angel-consecrated cathedral of Notre Dame du Puy, where the *Salve Regina* was first sung — vast and imposing, its façade, with arch rising above arch, decorated with the curious black-and-white mosaic peculiar to Auvergne; its swelling domes giving it a Byzantine appearance; its Clocher Angélique, from which the Angelus was first rung, rising above the altar of Mary; and its huge tower of the eleventh century, built of volcanic rocks, each story diminishing in size, dark, heavy and ungraceful, but, towering from the immense edifice twenty-four hundred feet above the level of the sea, a truly striking and picturesque object at a distance. One's first impulse is to visit this venerable sanctuary; but as it was too late an hour we established ourselves in pleasant rooms overlooking the Place du Breuil, a handsome square with a large fountain in the centre, surrounded by public buildings of modern style, with a spacious promenade on one side embowered by plane-trees.



St. Michel de l'Aiguilhe, Le Puy.

Early the next morning we started for the cathedral. We soon found ourselves in narrow, gloomy streets of mediæval character, lined with dark, lava-built houses, and shops with broad, unglazed Roman arches. Before the doors sat women in queer caps rattling their bobbins as they swiftly wove their beautiful lace, and chattering as fast as they wove. At the corners of the streets, and before many of the houses, was a Madonna, with a lamp generally lighted on Saturdays and the vigils of Our Lady's festivals, or when some one of the neighborhood has a special grace to implore. Funerals and the annual processions stop before these niches to sing by way of salutation the familiar verse:

"Maria Mater gratiæ,
Mater misericordiæ,
Tu nos ab hoste protege,
Et horâ mortis suscipe."

At length we came to the immense staircase of one hundred and thirty-four steps, leading up to the cathedral, that excites the astonishment of every one who sees it for the first time. It is constructed of great blocks of lava, with platforms at certain intervals where booths are erected on high festivals for the sale of objects of devotion. Ascending these flights one after another, we came to a great cavernous archway over sixty feet in length, leading up to the Porte Dorée, the grand entrance to the church, which is supported by columns of red porphyry. Here we found ourselves in a pillared portico resting on three great arches directly beneath the nave; for the church, not having room on the narrow mountain-shelf, projects over the side of the precipice, upheld by immense arches resting on enormous pillars. On the sill of the Porte Dorée is graven a Latin distich running thus: "If thou keepest not thyself from heinous offences beware of crossing this threshold, for the Queen of Heaven wishes to be honored by hearts pure from all stain."

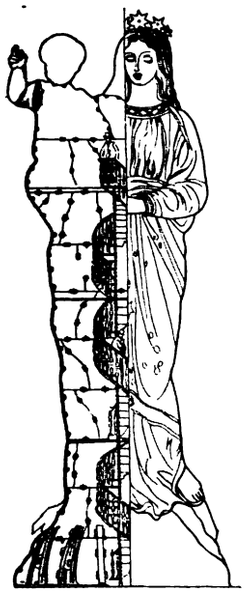
In former times the staircase continued to ascend beyond the Porte Dorée, and led to an entrance in the church above, between the nave and the high altar. This enabled the ministering priests on great festivals to give his benediction not only to the worshippers actually in the church, but to the multitude that covered the immense flight of steps extending down into the very heart of the city. This must have been an admirable spectacle. Unfortunately this curious entrance has been closed, and two side rampes now lead up from the porch into the aisles.

The church, which is of the Romanesque style, is vast, solemn and cavern-like, with an air of venerable antiquity in keeping with its history. It contains seven altars with the same privileges attached to them as to the seven stations at Rome. Here we found priests absorbed in the holy mysteries, and groups of worshippers everywhere, particularly before the high altar, over which stands the black Madonna copied from the ancient statue. Directly above rises the Clocher Angélique, at the junction of the nave and transepts. The apsis of the church, which is square, is called the Angelic Chamber, being the original edifice at whose consecration "angels officed all." It is of the sixth century, if not older, and is simple and severe in style, without any decoration. The transepts are of the ninth century, and the greater part of the nave is of the eleventh. Each part retains the stamp of the period in which it was built, growing richer in ornamentation as it approaches modern times. There is an interesting series of frescos, quaint and in some respects admirable, and saved from ruin through Prosper Mérimée, and attributed by some to Benedetto Ghirlandajo, who is known to have worked this side of the Alps.

In one of the chapels are the relics of St. George — not him of Cappadocia, but the first apostle of Velay, commissioned, according to tradition, by St. Peter himself. It was he who set apart the summit of Mount Anis, planting around it a hedge of thorns to keep it from profanation, in fulfilment of a divine indication very similar to that which led to the foundation of Santa Maria Maggiore at Rome. Here St. Martial, the great apostle of Aquitaine, set up an altar in honor of Our Lady and deposited precious relics he had brought from the East. But it was St. Evode, or Vosi, who erected

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the church that became celebrated as the Église Angélique. The old legend says that when he approached for the purpose of consecrating it the bells began to ring out, untouched by human hands, and the doors opened of themselves, showing thousands of torches burning in the sanctuary and the altar still flowing with the oil angels had poured on the stone of sacrifice, the rich odor of which perfumed the whole building. It was the renown of this Angelic Church and its altar to Mary that drew settlers to Mount Anis, forming a town that finally grew into the capital of Velay and the see of a bishop. The church was, from the first, considered a place of such special sanctity that no one was allowed to be buried within its walls — a rule so strictly observed that the canons refused to allow John of Bourbon, one of the greatest bishops of Puy, to be buried therein, though a large sum was offered for the privilege. Its greatest treasure was the statue that became renowned as Notre Dame du Puy. This has been attributed to various kings, such as Charlemagne and good King Dagobert, but most writers of modern times think it was brought from the East by St. Louis, though there seems to be no proof of this whatever. It is certain that Our Lady of Puy was in great repute long before the time of St. Louis. Most of the Capetian kings came here to pay her homage. Centuries before the Crusades the old Counts of Bigorre in the Pyrenees consecrated their domains to St. Mary of Puy out of devotion, and paid her an annual tribute as her vassal. In 1062 Count Bernard of Bigorre fixed this sum as sixty sols morlàas. At all events the statue honored here from time immemorial was no doubt brought from the East, for it was curiously carved out of some Oriental wood — cedar, ebony or setim-wood — that had grown quite black with the smoke from lamps and censers. It was of singular but noble aspect. The Virgin was seated on a kind of stool, with the Child on her knee. Both were closely swathed after the manner of Egyptian mummies, and covered, all but the faces, with papyrus, a portion of which is to be seen in the museum at Puy. . . .



Statue of Notre Dame de France on the Rocher de Corneille,[1] Le Puy. After *L'Illustration.*

The statue of Notre Dame du Puy was brought forth in procession on great occasions, as in time of famine, pestilence and war, to propitiate the divine wrath. At such times it was attended by the Four Barons of Our Lady, chosen from the highest nobility of the province, who considered it an honor to belong to the *Garde noble de la Vierge.* They bore the canopy over the sacred image or walked beside it with drawn swords. In the time of Joan of Arc, and in all great wars, it was thus brought forth into the city. An old author relates how the people on one of these occasions "shed scalding tears before the devout image, lovingly beseeching the Virgin Mary to obtain peace and concord for the kingdom of France." Louis XI had this holy image brought out twice in solemn procession. On one of these occasions Bishop John of Bourbon had all the tapestries belonging to his family brought to Puy to line the streets and decorate the *reposoirs*, and a hundred servants of his family opened the procession, carrying torches on which were pictured the arms of Bourbon. . . .

In 1793 the statue of Notre Dame du Puy, venerated for so many ages, was torn by the revolutionists from the niche of Louis XI, shamefully dragged through the streets, and, to the utter consternation of the pious inhabitants, burned on the Place du Martouret — the very square where, in 1512, the Vicomte de Turenne and other great barons of Puy held guard around the Virgin, while the people shed burning tears and uttered lamentable cries, praying for the mercy of God. But happily the Chambre Angélique was respected,

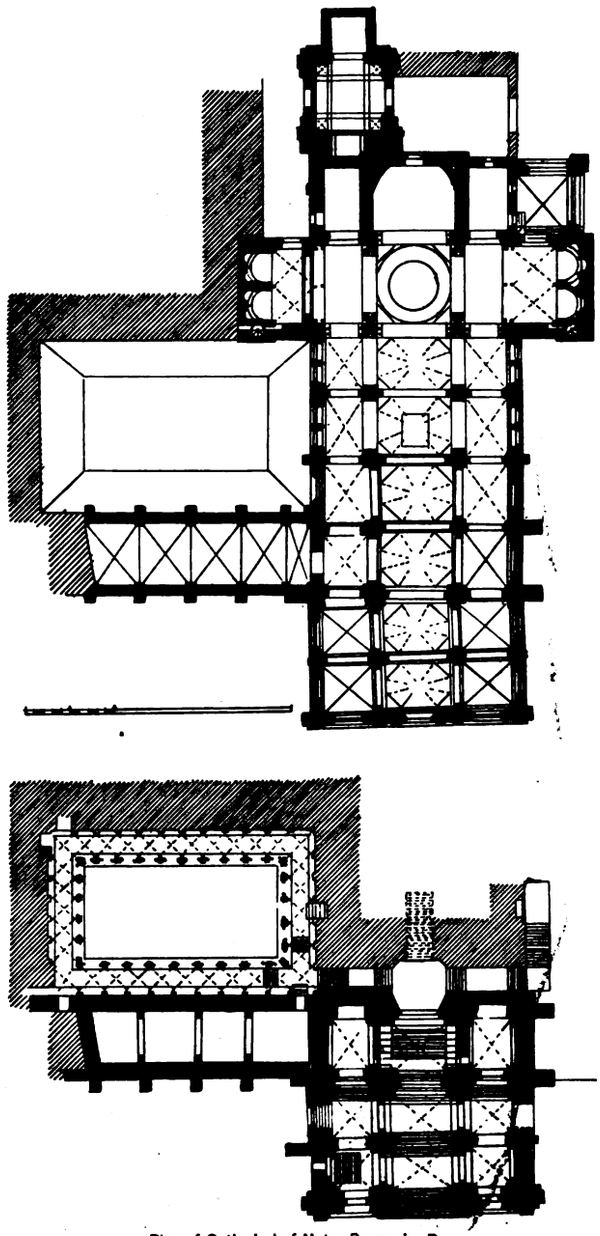


Plan of St. Michel de l'Aiguilhe, Le Puy.

and an exact copy of the ancient statue has been made, which draws nearly as many pilgrims as in the Middle Ages.

A steep, winding way behind the cathedral leads up to the top of the Rocher Corneille. Here are two terraces, one above the other, planted with shrubs and flowers, with fountains diffusing freshness with their spray, amid which plays a constant rainbow. At the corners of the octagonal pedestal on which stands Notre Dame de France are placed eight cannon from the Crimea.

The idea of erecting a statue of the Blessed Virgin on the summit of this lofty cliff was first suggested by the Père de Ravignan in 1846, but its accomplishment in the year 1860 is due to the pious energy of Mgr. de Morlhon, then bishop of Puy, who sprang from one of the noblest families of Rouergue, but who took more pride in the title of the "Evêque de la Grande Madone" pleasantly given him by Pope Pius IX on this occasion. Cardinal — then Abbé — Bonaparte became a member of the commission for its erection. Another member was one of the Lafayettes of Auvergne. Napoleon III and the Empress Eugénie were the first to subscribe to the work. All France aided, especially the clergy and the religious institutions. The pedestal was given by the three hundred thousand pupils of the Brothers of the Christian Doctrine. When Marshal Pélissier, then in the Crimea, heard of the undertaking, he wrote Mgr. de Morlhon: "Ask the emperor for cannon. He will tell us to take them, and we will." The bishop made the request, and the emperor promised all that should be taken from the Russians. Three days later Sebastopol was captured, and two hundred and thirteen cannon, weighing one hundred and fifty thousand kilogrammes, were soon placed at the bishop's disposal. The statue was modelled by M. Bonnassieux, the artist who, under Louis Philippe, refused to make a statue of Voltaire, and was afterwards decorated by Napoleon III for his "Meditation." It was cast in one hundred pieces and brought to Puy in five vans. The bells rang at its approach, and the inhabitants went out to meet it with a



Plan of Cathedral of Notre Dame, Le Puy.

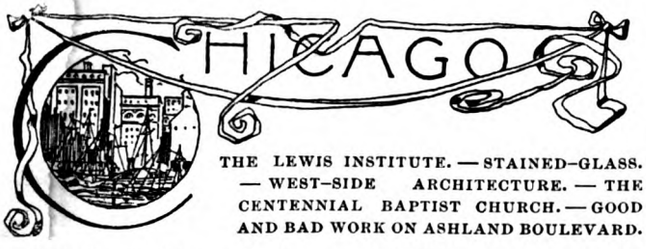
[1] It has not been possible for us to determine whether this statue is of cast-iron or of bronze; some authorities give it one way, some the other. At all events the figure is 16 metres high, and has a largest circumference of 17 metres; it weighs 100,000 kilogrammes and was cast in 80 pieces out of metal derived from 213 cannon captured at Sebastopol. It stands upon a pedestal 7 metres high and as shown in the section, a spiral staircase having 53 steps runs to near the top of the figure, the crown upon the Virgin's head being reached by a ladder from this point. — EDS. AMERICAN ARCHITECT.

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peal of trumpets, singing the *Salve Regina*. The students of the seminary aided in drawing it up to its destined place. The statue is said to be the largest ever cast, being, of course, of a size proportionate to the cliff and its height from the valley. The Virgin is fifty feet tall and rises twenty-five hundred feet above the level of the sea. The globe on which she stands is sixteen feet in circumference. Beneath her foot is an enormous serpent fifty-four feet long. But the size of the statue does not detract from the beauty and religious character of the subject. The figure of Mary is full of dignity, grace and harmony. She has her hand placed caressingly under the foot of the Child, whose arm rests on his Mother's neck, expressive of mutual love. A crown of stars is woven in her flowing locks, and her graceful mantle is sown with flowers and precious stones. Her attitude, with one foot on the head of the serpent, is noble and firm, but light and full of grace. On the base is graven the *Salve Regina* in huge letters.

At the unveiling of Notre Dame de France there was an immense multitude. The streets were in festive array. Procession after procession came in from the country with banners of all colors, singing their favorite hymns. An altar was erected on the Place du Breuil, where St. Vincent Ferrer once preached, and here Pontifical Mass was celebrated. Around the altar were gathered fifteen hundred priests, seven hundred frères, about a thousand sisters of different orders, five hundred penitents in their costume, with bishops, archbishops and cardinals. The weather had been wild and stormy, but hardly was the statue unveiled before the sun burst forth from the clouds, lighting it up with golden splendor, at which there rose the cry of "Vive Notre Dame de France!" from the vast throng. The *Salve Regina* was then intoned and caught up by a hundred thousand voices. At night the town was illuminated and there were fireworks on all the neighboring heights. The cliffs of Espaly, Polignac, the Aiguilhe and the Rocher Corneille itself, looked as if their volcanic fires were once more in action, sending forth flame after flame till the whole heavens were illuminated.

After the death of Mgr. de Morlhon the town of Puy had a kneeling statue of him in bronze placed at the foot of Notre Dame de France. It was the intention of this pious bishop to erect a colossal statue of St. Joseph on the cliff of Espaly — a happy idea, to transform the place where kings had lived and bishops entrenched themselves, that had been besieged by Huguenots and insurgents of all kinds and witnessed the horrors of civil war, into a place of pilgrimage and devotion — but he died before the plan could be put into execution.



THE LEWIS INSTITUTE. — STAINED-GLASS. — WEST-SIDE ARCHITECTURE. — THE CENTENNIAL BAPTIST CHURCH. — GOOD AND BAD WORK ON ASHLAND BOULEVARD.

THERE will, this month, be opened in Chicago, an institution which for nearly twenty years now has been looked upon as one of the future possessions of our city. This is the Lewis Institute, a combination of polytechnic and manual training-school, which from the small tuition charged to its pupils will be within the reach of many who might otherwise be forced to be satisfied with purely a high-school education. Allen C. Lewis left by his will, which was admitted to probate in November of the year 1877, the larger part of his estate, amounting to $550,000, for the founding and maintaining of this school, which is now known as the Lewis Institute. When the amount was turned over to the school trustees in 1895, it had increased to $1,600,000.

There will be a preparatory department, where, with the exception of the manual exercise, the usual line of studies is followed out. The Academic department includes two divisions, first, that of science and technology, and second, that of arts and commerce. In the Collegiate division, four groups are arranged, science, technology, art and commerce. To quote from the prospectus: "In the science group special emphasis is placed on mathematics, natural sciences and modern languages, as a preparation for advanced work in general science, engineering and architecture. Students who complete the work of this group will be qualified to enter the junior, or third-year class, in any school of technology." It seems a little curious in the wording of the prospectus that architectural students are placed in the science group, while that termed technology group or art group has nothing whatever to do with men of that class. In the department of drawing and design, the course mapped out for the student in the preparatory division is as follows: Freehand and instrumental drawing, cast drawing, illustrative drawing (three-quarters).

Academic division continues the course with freehand and instrumental drawing, cast drawing, historic ornamentation, design, water-color, sketching (three-quarters).

Collegiate division completes the course with (*a*) architectural drawing, working-drawings, ornament and decoration, sketching and measured drawings, water-color rendering, planning of buildings, specifications, contracts and estimates (six-quarters). (*b*) Drawing and machine design, working-drawings, machine and engine details, problems in mechanism, construction and machine design (six-quarters).

Though the force of teachers seems to be settled as a general thing, the instructor in freehand drawing and the instructor in mechanical drawing seem not to have been decided upon at the time of the publication of the prospectus. What the practical results of the school will be remains to be seen. Twenty years ago, when Mr. Lewis conceived the scheme, there was need in Chicago for just such an establishment, but now, with the Art Institute in connection with the Armour Institute, besides the South Side Manual Training school that compete with them, very excellent work will have to be accomplished. Of course no second-class school is a good thing anywhere, and how much we need another first-grade school here might be a question which would be open to discussion.

Though the maximum number of students in any class is to be twenty-five, the building of the Institute is estimated to be able to hold one thousand students. This present building, now just completed, extends over a large part of the square on the corner of Madison and Robey Streets. The main structure is six stories high, above a basement which will be used for purposes not connected with the school. The six main stories are given up to libraries, laboratories, lecture-rooms, class-rooms and studios, while at the rear are the two stories devoted to workshops. On the Robey Street side two stories are given up to a lecture-hall which has a seating-capacity of seven hundred and fifty.

So much for the practical side of the structure, which was designed by Mr. Henry Ives Cobb. It is Italian Renaissance in style, built of buff Bedford stone and terra-cotta, notwithstanding the fact that the circular makes the assertion that "the buildings are fireproof structures of brick, sandstone and terra-cotta." In view of much of the excellent work which Mr. Cobb has done, and the much which he expects to do, it is surprising that anything so poor in design should have been allowed to leave his office in the first place, and that, secondly, that such miserable execution of the designs as seen in the stonework and carving should have been accepted by him. A stone entrance to the building emphasizes the northern façade, an entrance on which considerable carving has been bestowed. This entrance shows an unusual combination of Classic columns in groups of three, the capitols of which follow a very infrequently chosen model, far from the purest style. These carry a somewhat clumsy entablature whose lintel is curved. The character of the carving of this lintel has no striking excellence of execution to excuse the adoption of its style. Especially around this entrance, wherever any delicacy of design has been attempted, extreme weakness has been the result. This, no doubt, in a measure is due to the exceptionally poor work done in the carving. The whole stonework has been poorly cleaned down and nearly its entire surface presents a rough mottled appearance not at all in keeping with the refined elegance of Classic models. Especially is this true of the stone used immediately above the band-courses of the so-called basement story, in the bases for the pilasters which extend through four or five of the succeeding floors. These pilasters are another weak feature of the building, being somewhat deficient in good proportions and surmounted by a cap equally as degenerate as the style used in the other parts. Square window-openings at regular intervals pierce the northern façade, till the upper story below the attic is reached, when a row of Romanesque openings break the monotony. The attic story is better handled with its heavy Italian cornice and decorative panels introduced between the lights. The west façade is freer in design and better in general effect, one portion of the scheme with large arches being especially satisfactory. The interior is light and airy and, as far as a casual inspection can determine, is well suited to its needs. The entrance hall, lined with brown marble with simple mosaic floor, is unobtrusive and good. The staircase, which can be such an architectural feature, fails in this part of its mission. The balustrade, which consists of a passable honey-suckle design, ends in the usual atrocious newel-post. For so small a feature it is curious to notice how often this newel-post is pronouncedly bad, and when good, how much it does for the whole character of the stairway. It seems a pity that a building which is to be the home of a technical school should be in itself so little of an inspiration to really good architectural work. That it should pass muster before the indiscriminating eye of the general public as a fine building is not sufficient; it should be inasfar as it goes, the best object-lesson which the students could have, seeing it daily as they do. Perhaps its well-known designer recognized that the standard of architecture in this division of the city was generally not up to the grade of excellence of that in other parts, and so considered that no supreme effect was necessary to make the building quite equal to its surrounding neighbors. The assembly-room is a rather commonplace apartment, rendered still more commonplace by the introduction of an abundance of stained-glass of a mediocre quality. Some half-dozen long narrow windows light the hall, composed entirely of amber-colored glass, into each of which is introduced a portrait medallion of some celebrated man, with some of his "remarks" placed underneath. If these could have been works of art it would have been an excellent idea, and though not strikingly bad, they certainly would not seem up to the grade which one would expect to find in a technical school.

Stained-glass in this immediate vicinity is as popular, and in many

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cases as bad, as it was generally fifteen years ago, when colored glass was, so to speak, discovered in this part of the country, and the average house-window was turned into a kaleidoscope. One modest brick church just around the corner from the Lewis Institute is fairly riotous in stained-glass, principally of this kaleidoscope variety, and no available window is left unset with the fascinating little cubes and angles. This church, in the matter of stained-glass, only seems to set the fashion to its neighbors, and every window in nearly all the surrounding houses has its portion of crude and vivid coloring. In fact, in this vicinity, Robey and Munroe Streets, there are some of the most startling examples of architecture as the art was understood and practised presumably fifteen or twenty years ago. One block of houses is simply laughable in its attempt at ornamentation. Built of a coarse gray stone, presumably sandstone, a yellow stone has been introduced in the most unexpected places, and its manner of introduction is chiefly after the manner of gold-filling in the weak and fragile molar. Where not thus introduced, this buff stone is used as the material for the most elongated and attenuated columns, presumably Romanesque in design, but only just falling short in their capitals, at least, of becoming the Egyptian lotus-bud capital. Some evil-minded person has unkindly said that Chicago on its North Side is characterized by the spirit and general atmosphere of Boston, on its South Side by that of New York, while on the West Side, it's just Chicago. On looking at these dreadful houses one trembles for the architecture of Chicago, and the pride that pertaineth thereto. These houses were evidently built at the time of that awakening to architectural beauty, when one's enthusiasm was not balanced by a corresponding amount of education and discrimination, and one has only to see them to realize with Herr Nordau that America cannot be counted among the nations of the "degenerates," but to use Mr. Browning's words "—— the best is yet to be. The last of life, for which the first was made."

Across the street is a curious little house, built somewhat prior, one would say, to the Romanesque deformities, but not much more satisfactory in its results, though apparently more excusable in its attempt at good taste. Again, columns with attenuated shafts are placed on either side of each window-opening, these shafts being entwined with carved vines of some ivy description. As a pleasant relief to these and several other equally bad examples of the abuse of architecture is a very good little house of brick and buff Bedford stone. The first story is of stone, with not elaborate, but very good, carving. The design, which is of Early Gothic with a flavor of Romanesque still about it, is refined and good, and contains much individuality. The difference of the design on either side of the central window for the carving shows strength and assurance on the part of the draughtsman.

On Jackson Street the Centennial Baptist Church, a few blocks east of Robey, offers certain attractive features. Through the whole structure many good points are discernible, combined with great carelessness. On the west façade one attractive feature is the small cloistered colonnade, somewhat marred by a heavy and clumsy drain-spout passing directly in front of one of the arches, while a most charming little bit is the working out of a chimney a little to the right and above the colonnade. A corner tower, picturesque in design as far as the treatment of its upper portion is concerned, is lessened in effectiveness in the lower portion by having all its weight carried on piers, and the base utilized as an entrance. This is a favorite expedient here and not one to be recommended. The northern façade is not as satisfactory as the western, a poorly studied composition at its eastern end weakening the good effect of the whole.

Passing down Jackson Street, we soon reach Ashland Boulevard, the Back Bay, the Lake Shore Drive of the West Side. As we turn on to it, a house bearing the number 200 stands out with pleasing prominence from its surroundings, much of which, alas! are characterized by vulgar bad taste. This house is of buff-brick, a feeling of something Southern being suggested by its outlines and broad verandas; its proportions are extremely good, and the general impression of the house is one of refined simplicity. As said above, a low-roofed veranda passes across the front of the house, while in the second story two bays are harmoniously combined with a well-designed roof, containing two low dormers. There is no wealth of poor carving whatever, but in its unaffected simplicity it would seem to be a house which would promise to be as satisfactory fifteen years from now as at present. Directly across the street from it, two houses revel in most atrocious carvings, heavy red tile roofs, and a general display of bad taste, which makes one hate to look at them, especially as their owners would seem to be people of enough wealth to be able to get something better if they only knew enough to want it. Still we are not "degenerates," Herr Nordau, and it presumably is better to be struggling up to the top of the hill than to be trundling rapidly down, though the ascent may look like a mighty hard tug at times.

Next to those two graystone edifices, a brownstone façade raises its proud proportions, and it is an actual fact that on this front, which is elaborately carved, there are ornamentations in the style of the French Gothic, the German Gothic, Renaissance and Classic.

Just around the corner from Ashland Boulevard, on Washington, is a little house, which to see makes it almost worth while to have struggled through the bad taste of some of its neighbors. Its material is a warm yellow sandstone, and its style is a very pure French Gothic. Not only are the carvings most charmingly executed, but the designs are most successful, and it stands, in fact, an oasis of good taste in the midst of acres of the commonplace and worse than the commonplace.

It is a curious fact that all through this very excellent design, where the architect never loses his hold on his style through the entire façade, when he reaches his stone balustrade and the post which would correspond in the interior to the newel-post, away flies his fine conception of French Gothic and its balance is no longer retained, but a grasp is made at something half Classic, half Romanesque. Assuredly what the profession most stands in need of is to be well posted by a genius.

Near this charming house, turning back again on to Ashland Boulevard, we run across a Baptist Church of very pleasing design. The proportions are excellent and the general effect most satisfactory. The church is of red sandstone, and Romanesque in character, and built with a corner tower and low arcade towards the street. The caps of the pilasters of the arcade, as well as various other portions of the structure, are left plain for future carving, but after the debauch of carving which one has experienced in the near neighborhood, a plain surface is a relief.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

LE PUY, HAUTE LOIRE, FRANCE: FROM THE NORTH.

[Gelatine Print, issued with the International and Imperial Editions only.]

INTERIOR OF CATHEDRAL OF NOTRE DAME, LE PUY. DRAWN BY MR. ROBERT D. ANDREWS, ARCHITECT.

[Issued with the International and Imperial Editions only.]

ANOTHER view of the interior was published in the *American Architect* for January 3, 1891.

SOUTH SIDE OF FRONT PORCH OF SAME. DRAWN BY MR. ROBERT D. ANDREWS, ARCHITECT.

[Issued with the International and Imperial Editions only.]

NORTHEAST DOORWAY OF SAME. DRAWN BY MR. ROBERT D. ANDREWS, ARCHITECT.

[Issued with the International and Imperial Editions only.]

CATHEDRAL OF NOTRE DAME, LE PUY, HAUTE LOIRE, FRANCE.

THE Cathedral of Notre Dame dates mainly from the eleventh century, though parts of the cloister in the northeast of the building were built in the tenth century. It lies at the foot of the Rocher de Corneille and the entrance porch is reached from the Rue Hauteville by a broad flight of sixty steps which pass through the porch itself, four bays deep, and penetrate the nave itself for some distance. Formerly these stairs terminated at the foot of the grand altar at the centre of the church, with the result that the priest solemnizing mass at the altar could exhibit the Holy Ghost, not only to those in the cathedral itself, but to the still greater multitude of pilgrims who thronged this great flight of steps, and tailed off away down into the streets of the town. This arrangement has been changed, and after passing within the walls of the cathedral, the steps divide to right and left.

The exterior walls of the nave and the west front are worked in variegated *pateras* of light-colored sandstone and the dark-colored breccia, while the interior walls of the nave are decorated with twelfth and thirteenth century paintings.

Although the building is in the main of eleventh-century work, it contains traces and elements of Roman work, which dates back to the fourth century; in fact, the east wall of the apse is largely built of Roman fragments.

The great tower at the east end, with its seven stories, finds its prototype or its imitator in the tower of the Church of St. Michel de l'Aiguilhe not far away. Although the tower of the cathedral has a height of 56 metres, it does not rear itself so high by some two or three hundred feet as the great statue of "Notre Dame de France," on the Rocher de Corneille.

While the cathedral is extremely interesting, it is not to be compared as a freak with the Church of St. Michel, which crowns the extraordinary out-cropping spur called l'Aiguilhe, and which can only be reached after undergoing an interminable climbing of stairs, as one has to ascend 249 steps before he reaches the platform upon which the church is built, while a score or so more lead to the floor of the church. This structure was built wholly in the tenth century.

Elsewhere in this issue will be found an account of the colossal statue of "Notre Dame de France," on the Rocher de Corneille, which was erected in 1860, but we have been unable to find any description of the seemingly similar statue which stands upon the Rocher d'Espaly, about half a mile to the west of the town. We

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think it probable, however, that it represents St. Joseph and is the outcome of the project spoken of in the concluding paragraph of the article on Puy-en-Velay, which we print this week.

CLOISTER AND OTHER DETAILS OF SAME. MEASURED AND DRAWN BY MR. WALTER H. KILHAM, LATE HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP.

SOUTH TRANSEPT OF SAME.

SOUTH TRANSEPT PORCH OF SAME.

SOUTH TRANSEPT DOOR OF SAME.

[The following named illustrations may be found by reference to our advertising pages.]

ENTRANCE TO ST. MICHEL DE L'AIGUILHE, LE PUY, HAUTE LOIRE, FRANCE.

INTERIOR OF THE CATHEDRAL OF NOTRE DAME, LE PUY, HAUTE LOIRE, FRANCE.

DOORWAY OF NORTH TRANSEPT OF SAN MICHELE, PAVIA, ITALY.

[Additional Illustrations in the International Edition.]

LE PUY, HAUTE LOIRE, FRANCE: FROM THE WEST.

[Gelatine Print.]

The freak of Nature that produced the picturesque volcanic masses of breccia that give character to Le Puy and its surroundings, is no more extraordinary than the human whim that caused men of different generations and races to establish themselves and their abiding places amongst and upon these barren and undomestic heights. The necessities of self-preservation amidst predatory and warlike surroundings, the instincts of superstition and the hardly less hysterical requirements of religion must account for the founding and growth of this town of some twenty thousand inhabitants upon an elevation which has a mean level of some nineteen hundred feet above the sea.

The wisdom of the French Government in making some of the buildings in the town "historic monuments" has assured their preservation and conduced to their greater reputation, through the work of photographer and architectural draughtsman, while the general picturesqueness of the scenery and the fame of the pilgrimages that make resort to one or another of the ecclesiastical buildings in the town, have brought many travellers to this place. It is even probable that the fact, that all that remains of Bertrand Dugueselin, the great Constable of France, lies buried in the Church of Saint Laurent, may have drawn many a lover of history, chivalry and legend to Le Puy. In spite of all this, the place and its architectural interest are not generally known in this country and we trust that the matter we publish this week will lead many an architectural student to seek in this unique spot a vivid architectural impression.

WEST FRONT, ABBEY CHURCH OF ST. ETIENNE, CAEN, FRANCE.

"THE HAVEN," HARROW-ON-THE-HILL, ENG. MR. ARNOLD MITCHELL, ARCHITECT.

GARDEN FRONT, GROVE HILL COTTAGE, HARROW, ENG. MR. ARNOLD MITCHELL, ARCHITECT.

NOTES AND CLIPPINGS

The Venus of Milo. — The death of M. Henri Brest, whose name was celebrated many years ago in connection with the statue of Venus, now one of the great treasures in the Louvre Museum, brings to mind some interesting souvenirs connected with that statue. It was, indeed, M. Henri Brest who discovered the wonderful statue which had been unearthed by a peasant in the Island of Milo, and who bought it of him for a mere song in 1820. He soon sold it to M. de Marcellus, through whom it reached the Louvre. The wonderful statue remained undisturbed in the gallery of the Louvre, of which it was the principal ornament, till the Franco-Prussian War, in 1870, when the means of preserving it against the possible pillage of the Germans caused great anxiety to the Curators. Few Englishmen are probably aware that the Venus of Milo was on that occasion placed in an immense sort of padded oak coffin, and buried mysteriously in a great trench made to receive it in the courtyard of the Prefecture of Police. This was done in the middle of the night, in the presence of very few witnesses, with the object of keeping the hiding-place of the statue perfectly secret. It was thought by the officials of the Louvre that the statue was in perfect safety there; but their anxiety for the fate of the treasure was revived, after the signature of peace, by the outbreak of the Commune, and the setting fire to the Prefecture of Police and to the Palais de Justice opposite. Fortunately, however, when that insurrection had been put down, the Curators of the Louvre, on once more unearthing the statue, found it had suffered no deterioration. The inscription on the pedestal of the statue in the Louvre does not even mention the name of M Henri Brest. It relates simply that it was bought by M. de Marcellus for the Marquis de Riviere, the French Ambassador, who presented it to King Louis XVIII, in 1821. — *Paris Correspondence London Standard.*

Ely Cathedral. — Distant views of the cathedral, looming in the hazy distance like some huge vessel at sea, are gained from low eminences near Cambridge, from Newmarket Heath, and from various points on the roads from those places. But we shall doubtless arrive by railway, and on leaving the train and emerging from the station, we cannot fail to be struck by the picture before us. Lincoln on its hill, Durham on its rocky cliff, may have positions more imposing, but Ely has a charm of its own, rising, as it does, above masses of foliage, with humble low-roofed dwellings in the foreground, nestling amid gardens and orchards, and sheltered by timber trees. The vast church presides and dominates over the houses of the citizens, and dwarfs to insignificance the parish church with its spire, hard by, though this is of fair dimension and altitude. Lord Macaulay was wont to say that a visit to Ely was a "step into the Middle Ages." Probably he meant by this remark that the idea of the old ecclesiastical and monastic supremacy was irresistibly forced upon him by the contrast between the huge abbey-church and its secular surroundings. Ely has never expanded beyond the rank of a small market town or large agricultural village, and this character is abundantly evident as we gaze at the view before us, and as we advance on foot toward the summit of the gentle eminence crowned by the cathedral. — *Good Words.*

Veneers. — While the finer and thinner veneers of costly woods are sliced tangentially from the side of the log, there are woods that cannot be cut this way — no amount of boiling or steaming rendering it possible to cut them without breaking down the tissues to such an extent as to destroy their surfaces for polishing — while others, becoming discolored from steaming or boiling, and being too hard to cut otherwise, have to be sawed. The fine-toothed thin-gauged circular, with flanged centre, is the favorite for cutting all ordinary veneers thicker than thirty to the inch. Twenty to the inch is the thickness most commonly used for cabinet work and finishing, but much thinner is used in the case of rare and costly woods, or rare, abnormal or accidental figures, as in the case of burls. Some woods have to be cut much thicker, being unable to bear handling when too thin; genuine ebony, the only fine, really jet-black wood known, and large enough to be of any use, will not stand sawing much below one-fourth of an inch in thickness, owing to its extreme brittleness or want of cohesion, but there are several other woods that can be cut as thin as writing-paper and still be handled in large sheets. Other woods there are that will lose their fine color on exposure to the atmosphere, especially a smoky one. These are cut only when immediately wanted, and are kept covered until the finishers can put on a protective coat of some sort. — *Hardwood.*

The Arc de Triomphe, Paris. — The restoration of the Arc de Triomphe in Paris is a slow work, and the promenaders of the Champs-Elysées are grumbling over the scaffolding, which they consider is destined to be never removed. But more than a year will have to elapse before the structure emerges from the forest of squared timber. The architect, M. Esquié, who has charge of the operations, finds it is not easy to do all that is needed with 11,000*l.*, the sum assigned to the work, and it is likely that 2,000*l.*, in addition will have to be expended. The arch was commenced in 1806, and was not completed until thirty years afterwards. Builders were not more fortunate in discovering sound stone in those days than in our own. The stone, which was obtained from quarries at Chérence (Seine-et-Oise), was porous and during sixty years it has been deteriorating. Similar stone has to be employed in the restoration, and there is consequently a guaranty that restoration will again become necessary before the next century has been long in evolution. The work must be slowly done, for it is not possible to remove many stones at one time, and apparently the quarrymen are coöperating in the promotion of delay, by supplying stone in very limited quantities. — *The Architect.*

Carfax Church, Oxford. — Carfax Church, the old town church of Oxford, is being torn down, and only the tower will be left to mark the site. The parish of St. Martin Carfax will then be absorbed in that of All Saints. The name comes from *quatuor furcas*, four forks, the church standing at the crossing of the two main roads in the town. There is a record of a church standing there as early as King Canute's reign, but the present church is no older than 1820, while the tower goes back to Edward III. It was St. Martin's bell that summoned the townsmen in the fights between town and gown, the most famous of these contests being on St. Scholastica's day, 1355, when to the cry of "Slea, slea, havock, havock; smyt fast, give gode knocks," the town killed forty scholars, flayed the crowns of some chaplains, and shot at the chancellor. The tower served as a place of refuge for the town from the gown, and Edward III ordered it to be lowered. — *Boston Transcript.*

Exceptional Doors. — There are many old houses in Holland which have a very curious origin. There is one door which is never opened except upon two occasions — when there is a marriage in the family or a death. The bridge and bridegroom after their wedding enter by this door, after which it is nailed up or barred until the next marriage or death occurs, when it is opened, and the bride or corpse enters or is removed by this portal. — *Invention.*

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THE high building nuisance, as we are almost inclined to call it, seems to be approaching a climax in New York. Near the twenty-six-story St. Paul Building, which has, at least, the advantage of doing very little to shut out light and air from its neighbors, a thirty-two-story building is projected; and as the faithful and earnest Chief of the New York Fire Department sadly says, there appears to be no reason why such buildings should not soon reach a height of five hundred feet. Apart from the menace to the value of neighboring property, and to the health and comfort of the public, which the erection of such structures involves, Mr. Bonner points out that, however incombustible they may be, their occupants are always exposed to a certain risk, which increases with the height of the building. This risk is that of suffocation by smoke, and it is evident that smoke cannot be avoided. Even in an office-building, the burning of stacks of papers and movable furniture in a large office may fill the structure with blinding fumes, and the spread of such a fire from one office to another, through open doors or crevices, is greatly promoted by the draught which sets toward the elevator shafts and staircases in very high structures. It will be remembered that two ladies were once suffocated by smoke in trying to get down the staircase of an apartment-house in Chicago, before the fire, as we recollect, had gone far beyond the basement; and, although a person in a first-class office-building could probably get fresh air from an open window on the street, it would require some coolness to stay there quietly while cries of fire and shrieks of agony were resounding in the corridors outside; and the tenants of rooms opening on court-yards would be between Scylla and Charybdis.

BUT, as Chief Bonner says, it is not so much the present condition and occupancy of such buildings which inspires alarm as their possible future use. The office population of a great city is a limited and rather capricious one; and if more office-buildings should be erected than can find tenants, or if lawyers, architects, engineers and corporation officers who now have rooms in and about Wall Street should take a fancy to move to Madison Square, it will be necessary to rent their present offices to some one else. A great deal of mercantile business is done in New York by means of samples, and nothing would be more natural than to fill the places left vacant by the lawyers with manufacturers' agents, who might pile many tons of sample-cases of cotton goods, or ready-made clothing, on the floors of their rooms. Such cases would make a strong fire, which, if liberally fed by the contents of other offices, and urged by the draught of a vast chimney, five hundred feet high, would try the most obdurate combination of steel and terra-cotta that was ever put together, and might leave very little remnant of the living beings who happened to be in its way, and who, it must be remembered, would be far out of reach of any life-saving appliances from outside.

UNDER an agreement between the Boston Wholesale Granite-Dealers' Association and the Aberdeen Granite-Dealers' Association of Scotland, the latter binds itself not to sell granite to any dealer in the United States who is not a member of the Boston Association; and the Boston Association promises not to buy from or deal with any manufacturer of granite in the Counties of Aberdeen and Kincardine, Scotland, who is not a member of the Aberdeen Association. Although the granite dealers outside the combination do not approve of this agreement, we do not know that any attempt has been made to test its legality; but we are very much inclined to think that if any person in this country could show that he suffered loss of business, or other injury, in consequence of it, he could recover damages from the members of the Boston Association. The policy of our laws is to give people all the liberty that they need in making contracts for their own government, but to oppose the making of contracts by which other people, not parties to the agreement, are affected. A man might contract to buy the whole output of a manufactory of granite, or of anything else, without infringing the rights of others; but in regard to an agreement with a manufacturer that he shall not sell goods to any one else, whether he is in a position to furnish them or not, the other people who would like to buy the goods, and are prevented from doing so by such an agreement, have something to say. It will be remembered that in a recent case in New York, where an association of stone-dealers has a similar contract with the principal quarry-owners, the dealers' association refused to admit any new members, so that persons trained to the business, and possessing the necessary capital, were, and probably still are, prevented from practising the profession for which they had properly prepared themselves; and it is altogether likely that our Courts will find means for correcting such obvious abuses.

THE movement for the removal of Mr. Stevenson Constable, Superintendent of Buildings in New York, which was made a good deal of in the newspapers at one time, seems to have failed completely. The petition to the Mayor for his removal, which was signed by fifty-three persons, alleged to be architects or builders, was referred by the Mayor to Mr. Constable himself for comment. In reply, Mr. Constable said that six of the signers had already written to him, withdrawing their names from the petition, most of them saying that they had been induced to sign it by false representations. Of the remaining forty-seven names signed to the petition, seven were simply forgeries, leaving forty to be accounted for. The owners of twenty-five of these names had never had any dealings whatever, in any capacity, with the Department of Buildings since Mr. Constable took charge of it; so that his alleged remissness could not have injured them very seriously; and seven of them could not be found at the address given in the petition, and were unknown to the Directory, so that it is quite probable that they were entirely fictitious; while another called upon Mr. Constable, and said that he had been hired to get names signed, at ten cents apiece. Of the fifteen signers who had really had dealings with the Department, six had presented plans which contravened the law, or had in some other way attempted to evade the statutes relating to buildings; one had persisted, in spite of repeated warnings, in erecting a building without filing plans, or obtaining a permit; two more were day-laborers employed by this valuable citizen; and one was a strenuous advocate of the bill to amend, and practically annul, the present Tenement-house law, which bill was defeated in the last Legislature mainly by the efforts of the Department of Buildings, seconded by the best part of the New York press, and the citizens who have done so much to improve the tenement-house system. After this effectual demolition of the much vaunted "charges" against Mr. Constable, the Mayor let the subject drop, being unwilling, as he said, to dignify

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such an assault even by a trial of the case; and New York has reason to congratulate itself that one more faithful and efficient public servant has successfully resisted schemes formed against him by the people to whom his efficiency is troublesome.

THE season of architectural exhibitions is at hand, and bids fair to open auspiciously. This year the Baltimore Architectural Club is to hold its first exhibition, from November 2 to 28, inclusive. Drawings or decorative paintings will be collected, forwarded to Baltimore, and returned, free of expense, to exhibitors in New York, Boston, Philadelphia, Baltimore and Washington, but exhibit entry blanks must be returned on or before Thursday, October 15, and exhibits must be ready for the visits of the collector in New York, Boston and Philadelphia on Monday and Tuesday, October 19 and 20; in Washington on Thursday and Friday, October 22 and 23, and in Baltimore on Friday and Saturday, October 23 and 24. Photographs of old work will also be received. The exhibition is to be held in the Peabody Institute. The Committee earnestly request the coöperation of the profession outside of Baltimore in their endeavor to make this, the first exhibition of the kind in the city, interesting to the public, and representative of the art of architecture in the United States. The Secretary of the Club is Mr. Wm. M. Ellicott, Jr., 8 East Lexington St., Baltimore.

IN Philadelphia, the T-Square Club will hold an exhibition at the Academy of Fine-Arts, in December, in connection with the annual Academy Exhibition of Painting and Sculpture. These exhibitions have already become a well established part of the artistic calendar in Philadelphia, and it is only necessary to say that the next one promises to be as successful as any of the others. Two of the members of the exhibition-committee have sailed for Europe, and hope to bring back with them some interesting foreign exhibits. When the details of the affair are arranged, we shall undoubtedly be able to give further particulars.

ANOTHER of the brilliant architects who have done so much within the past fifteen or twenty years to develop artistic feeling in Philadelphia, Mr. T. Roney Williamson, died recently. Mr. Williamson was one of the original members of the T-Square Club, and always enthusiastic in promoting its welfare. He had a large practice in various parts of the country, as well as in Philadelphia, and maintained a branch office at Grand Rapids, Michigan.

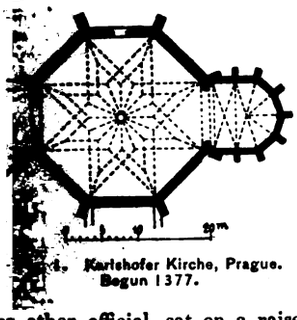
THE story which we found in the New York papers some time ago, to the effect that a huge steel tower was to be built in Chicago, turns out to have been a little premature. Some plans have indeed been made for such a tower, and the matter is in the hands of persons who hope to be able to raise money to carry out the scheme; but this is a very unpropitious time for floating new enterprises, and it is, indeed, not even decided whether the structure will be erected in Chicago or some other city. As to this, we can say that we hope that Chicago may be the place chosen, and that the plan may be carried out successfully. Of course, the Eiffel tower is anything but a beautiful architectural object, and an imitation of it is not likely to be much more attractive; but there are architects in Chicago who can undoubtedly give it some artistic interest; and a high tower, from which visitors can see something of the greatness and power of the most wonderful of our American cities, would be an excellent thing; while the aërial halls and entertainment rooms with which it is intended to occupy its vacant spaces would be of real value to the health of the citizens in hot weather.

THE workingmen of Chicago have shown in a most creditable way the independence and common-sense which befits American citizens, by sending a commission, consisting of two intelligent men, to Mexico, to study the condition and prospects of workingmen in a country which has had several years' experience of the workings of the silver standard of value which it is proposed that the United States should adopt. The two commissioners will return about October 1, and will make report of their observations to their fellows. It is hardly necessary to say that this report will be of great interest to the public generally, as the result of expert examination of matters which only an expert can judge with full intelligence. The alluring predictions and promises of people who are trying to catch votes pass for very little with the better class of workingmen, but if there is any real substance in the mass of rhetoric which is poured out upon them in regard to a financial question which they have never had occasion to study, and about which men of special training hold different views, they would like to know it, and the Republic is fortunate in possessing citizens who are disposed to make inquiry for themselves instead of trusting blindly to the asseverations of people who may have an interest in misleading them. In a certain way, Mexico is prosperous. New industries are rapidly springing up, and the cultivation of its soil is profitable enough to attract a good deal of foreign capital. Whether this, however, means that the speculators are growing rich at the expense of their workmen, by paying wages in silver, and selling their product at gold prices; or whether the prosperity is real, furnishing not only speculators, but workingmen, with sufficient employment, at wages bearing the same proportion to the value of the articles which they help to produce that they do in gold-standard countries, is a question, the answer to which is of vital importance to our people. Compared with this, the discussion of the "crime of 1873," of international bimetallism, of the personal motives of the "gold-bugs," of the "revolution" of the "masses against the classes," is a waste of time and trouble. What the workingman wants to know is not whether this country is secretly governed by "four crowned monarchs sitting in a back-parlor in London," but whether, if the country adopts a new standard of value, he and his family will get as good a living as they do now, or rather as they did a few years ago, before business was checked by the appearance of the probability that the standard might be changed. He has a right to obtain information on this subject, in such a way as he may see fit, and to act accordingly, and every one who lives on wages, or a salary of any kind, will eagerly welcome authentic statistics bearing on the matter.

THE New York *Tribune* mentions some cases, of a sort well known to architects, where tenants occupying buildings which must be removed to make room for extensive improvements demand, and occasionally receive, enormous sums as consideration for giving up the unexpired term of their leases. Forty thousand dollars is reported to have been paid for a three-years' unexpired term to a saloon-keeper who occupied a portion of the site of the Havemeyer Building; and twelve thousand is said to be demanded for the lease of another saloon on Thirty-sixth Street, which has only seven months to run. When the Siegel-Cooper store, on Sixth Avenue, was built, a small frame house occupied a portion of the lot. The tenant demanded fifteen thousand dollars for his lease, which had only a year or so to run, and the contractor for the building, seeing how much his operations would be facilitated by having the whole lot cleared at once, offered to pay him five thousand dollars in addition to whatever the owners should give. The owners, however, refused to pay the fifteen thousand dollars, and the building was erected around the little house, leaving its tenant to enjoy in peace his calculations in regard to how much better off he would have been if he had been more reasonable in his notions, until the lease expired; then the old house was cleared away in a single night, and within a few weeks the great building was complete. In other cities, the same difficulty is often found in getting control of leased estates for improvements. Two hundred thousand dollars is said to have been paid for an unexpired lease in Boston; and the tenant of an office in a building which it was intended to improve is said to have been paid thirty thousand dollars to find another room. In fact, long leases of well-situated buildings in a growing city are often very good property. Many a man has secured for himself a good income, and sometimes a large one, for several years, without any trouble, and practically without risk, by taking advantage of an opportunity to secure on moderate terms a long lease of an estate already occupied, or available for tenants. If the income received from the sub-tenants does not pay the agreed rent of the estate, a little energy expended in getting tenants for the unoccupied rooms will generally be sufficient to make up the deficit, and the increasing demand which is sure to follow the extension of business soon justifies advances in the sub-rents, to the profit of the principal lessee; while there are always chances that the principal lease may, through some unforeseen contingency, be disposed of at a large profit.

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THE DESIGN OF PROTESTANT CHURCHES.[1] — I.



1. Karlshofer Kirche, Prague. Begun 1377.

ARCHITECTS hardly need to be told that the plans of European churches are derived, in general, from two primitive types, or rather, from two distinct variations of one original type. Leaving out of account the few ecclesiastical structures based on the imported Oriental system of clustered domes, and the still fewer narthex churches, all European church buildings down to modern times trace their ancestry back to the Roman basilica or court-house, in which the prætor, or other official, sat on a raised platform in a semicircular recess at one end of a long rectangular building, with an altar in front of him, at the edge of the platform, before which he took and administered the necessary oaths, while lawyers and jurymen sat on either side of him, on the same platform, and the public filled the main body of the room, or, as we should now call it, the nave. At the time of the Christianization of the Roman Empire, the material prosperity of the country was declining, and many of the basilicas, particularly in the county towns, stood empty. These were appropriated for the public worship of the Christians, the bishop sitting, on occasion of divine service, in what had been the judge's seat, while the elders and inferior clergy occupied the lawyers' places on the platform, and the congregation filled the remainder of the hall. Even the galleries, which had been arranged in the ancient basilicas for the accommodation of privileged spectators, were utilized by the Christian congregations, generally as a reserved space for women. Naturally enough, the attachment which most people feel for the scene of their best thoughts and most sacred experiences came, in the minds of the Christians, to be associated with the basilicas, where first they had been allowed to hold their services in freedom and safety; and, even to this day, the basilica plan is so intimately connected with our idea of Christian worship that a person who suggests a different arrangement for a church is, in most denominations, regarded with aversion and suspicion, as a radical, if nothing worse.

In ancient times, however, an important modification was imposed upon the basilica type itself, to adapt it to the new conditions existing in certain places. About two hundred years after the formal proclamation of the conversion of the Roman Empire to Christianity, a great missionary enthusiasm began to manifest itself in the church, and little colonies of working ecclesiastics, vowed to brotherhood and self-sacrifice, were sent out to convert the heathen, and bring them into the ways of order and salvation. These parties of men, chosen, like our own missionaries, from the educated class, and trained in the same way for their work, by instruction in the arts conducive to the material, as well as the spiritual, welfare of their future pupils, went forth over Europe, in such direction as their superior officers might indicate, and established among the heathen of France, Germany, Switzerland and Britain the modest mission stations which, in almost all cases, developed later into important towns. After the selection of a site for their new establishment, a selection in which a dream, or vision, or other miraculous indication often played an important part, the first care of the good monks was always for the spiritual welfare of the souls among whom Providence had led them; and even before they had shelter for themselves, they made provision for a church building, in which to conduct their services in presence of the heathen. So far as was possible with such simple structures, they planned their little churches of logs and clay in the fashion of the basilicas, to which they had been accustomed; but, in view of the demonstrative hostility to the new religion of many of the devotees of Odin and Freya, whom they had come to convert, it was soon found advisable to shut off the portion of the church in which the sacred offices were performed from that to which the heathen were admitted, by a screen, or partition, strong enough, and high enough, to prevent the pagans from jumping over and interfering with the ecclesiastics. A somewhat similar separation had been made in the secular basilicas, before the Christian era, by setting up palings or "*cancelli*," at the edge of the [illegible] or raised platform, on which the judge and the lawyers [illegible] to keep the crowd in the nave from annoying the court, so that the idea of maintaining such a boundary was not new; but, while the Christian basilicas in Italy had, as a rule, lost all trace of this separation, the whole of the church being open to the faithful, those established among the heathen not only retained, necessarily, the *cancelli*, but developed them into effective barriers. As usual in such cases, the fashion, once adopted, remained after the occasion for its adoption had passed away. The mediæval priests, it seems, felt that this barrier, originally intended for their defence, served to give them, by separating them from the laity, an artificial sanctity, and, probably for this reason, the screens increased in height with the spread of Christianity among the people, until, as, for example, at Chartres, nothing could be seen by the congregation of the service at the altar, except by looking through the single door which still forms the only opening in the stone screen,[2] fourteen feet high, built in the fourteenth century entirely around the sanctuary.

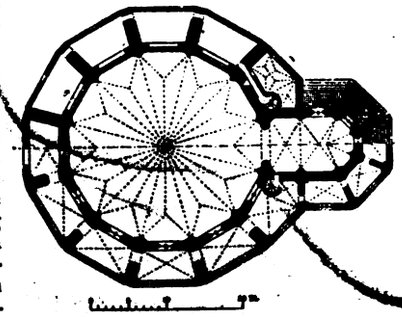


Fig. 2. Klosterkirche. Ettal 1330-75.

It is, no doubt, a feeling of the same kind which still leads the clergy in the modern English churches to enclose themselves in their "chancels" behind the iron screens originally designed to protect their predecessors from assaults on the part of their congregation; and the contest between the "chancel" or "choir" churches, in which, as in the mission churches of the sixth and seventh centuries, a space is reserved exclusively for the priests, and those churches in which clergy and laity have equal rights in the structure, has become in a certain degree one of doctrine, attachment to the former mode of planning indicating reverence for the priests, and hence, in the eyes of the latter, reverence for the Church; while a preference for the latter implies, in the opinion of some, at least, who profess such preference, the equality of all men, both clergy and laity, before the altar.

With the Reformation, as might be imagined, the latter idea received a special development in Northern Europe; but the churches built after the Reformation were by no means the first that had been erected for the congregation, rather than for the priests. Long before the Reformation, orders of preaching friars had been instituted in the Church, whose members were sent from place to place, to arouse the laity by their eloquence, and, in a certain measure, to reform the abuses which the increasing wealth of the convents and abbeys had fostered among the clergy. For the brothers of these orders it was necessary to provide places where they could preach, and in most of the large cities in Europe were built "Dominican" churches, planned exclusively with a view to accommodating as large a lay congregation as possible within reach of the voice of a single speaker. With the usual mediæval simplicity and directness, these Dominican churches were built in many cases, without aisles, nave, choir or chancel, consisting simply of a long, rectangular room, divided through the middle, where the width was too great to admit of vaulting with a single span, by a row of columns, to one of which was attached the pulpit. As a rule, the Dominican churches were very plain, but they were excellent places for hearing and seeing a preacher, and are worth keeping in mind as models for ecclesiastical buildings of a certain sort.

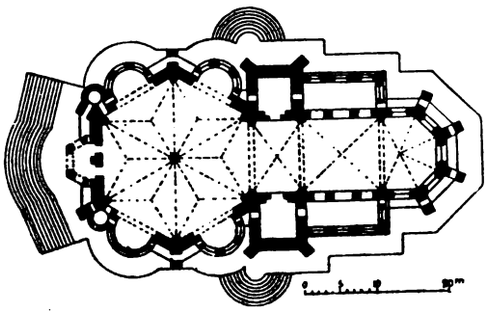


Fig. 3. New Parish Church, Regensburg. 1519-38.

The Dominican churches were, however, even in the Middle Ages not the only ones intended for congregations. In the free cities of the Continent, the citizens, who had struggled successfully against the whole power of the nobility, and had even, in many cases, dictated terms to kings, were not disposed to humiliate themselves unreasonably before ecclesiastical pretension; and a demand arose in the communes for "parish churches" as distinguished from the "regular," or convent churches. The parish churches, which were placed under the jurisdiction of native bishops, instead of foreign monks, were paid for by the contributions of lay citizens, and these claimed, and generally obtained, a much freer use of the sacred edifice than had been accorded in the churches of the "regular" clergy. In some places, the citizens secured, in return for their subscriptions, the privilege of using the parish church, or even the cathedral, where this was built by similar means, as a town-hall when they needed it; and some of them were even utilized as markets on the ordinary market-days. In these buildings the high stone screen of the regular churches was entirely wanting. As a rule, the whole interior was open and on the same level, with steps only at one end, where the altar was raised above the main floor and enclosed by a railing, about breast high, which often had a flat top, and served as a communion table. In other churches, the "presbytery," or separate space for the clergy, remained in the shape of a "Lady-chapel," or similar appendage, attached to the church, but not obstructing it; the effort of the laity everywhere being to secure for themselves an unobstructed view of the sacrifices at the altar, as well as an opportunity for hearing the service and the sermon.

[1] Much of the matter of these papers is derived from that most interesting and useful book, the "*Kirchenbau des Protestantismus*," a work which reflects equal honor on Herr Fritsch, its editor, and practically its author, and on the Society of Berlin Architects, under whose auspices, and with whose efficient aid, it was given to the public.

[2] See *American Architect* for September 19, 1891.

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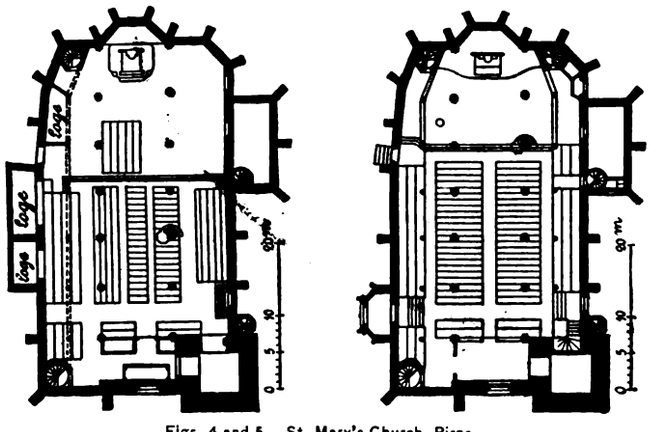
Just before the Reformation, a change took place in church-planning, perhaps as a result of the revival of the study of antiquity, which had then almost reached its height. Instead of the long rectangle, with or without an apsidal appendage, circular and octagonal churches began to appear in Northern Europe, taking their inspiration, apparently, from St. Sophia and the Pantheon, or, more probably, from the cathedrals of Florence and Rome. In these, the northern fancy for a nave surrounded by aisles was, in certain cases, ingeniously combined with the circular plan; while in others, the aisles were abandoned and the octagon or circle covered with a dome, in the Italian manner. It would be interesting to speculate upon the direction in which this innovation would have carried the design of Catholic ecclesiastical buildings, if it had been allowed to develop, but a far greater innovation was just then introduced into the doctrine and organization of the Church itself; and, in the struggles which followed the change, ecclesiastical architecture, considered as a progressive art, fell into a state of suspended animation, from which it is even now hardly beginning to emerge.

The Reformation was a political revolution, as well as a spiritual movement, and the establishment of the Protestant discipline in any given locality involved the abolition, or, at least, the restriction, of the old religion. For this reason, the congregations which the reformers drew around them only needed, when they wanted a house in which to hold worship, to avail themselves of the empty churches which they had themselves deserted not long before; and, as the official recognition of the reformed religion was commonly accompanied by the expulsion of the Romanist priests, there was no one left to object to the conversion of the old churches to suit the taste of the congregations which now hold undisputed control over them. It is a curious circumstance that, while the early Christians avoided all contact with the Pagan temples, regarding the ancient gods, to whom they were dedicated, as still active and malignant demons, and even the modern sects are not altogether free from a feeling of repulsion among themselves, which attaches itself to the houses in which they worship, the early Protestants, although they had perhaps suffered as cruelly from the Catholics as the early Christians did from the Pagans, never seem to have felt any hesitation in taking possession, for their own services, of the churches from which maledictions had been thundered against them; and the first portion of the history of Protestant church building is simply an account of alterations made in Catholic churches, to adapt them to new requirements.

In one respect, these alterations were radical enough. Where the priest, or the chapter, or the monks, had once been in supreme control of the ecclesiastical edifice, to which the laity were admitted only on sufferance, the laity were now the masters; and the church was remodelled with the idea, which has ever since governed the planning of Protestant churches, that the convenience of the congregation was the first thing to be considered. Nevertheless, as the Protestants at first clung to the idea that their work was simply a reform within the church, which they hoped to restore to its original purity, they were far from wishing to destroy such features of the old churches as did not interfere with their convenience or prejudice.

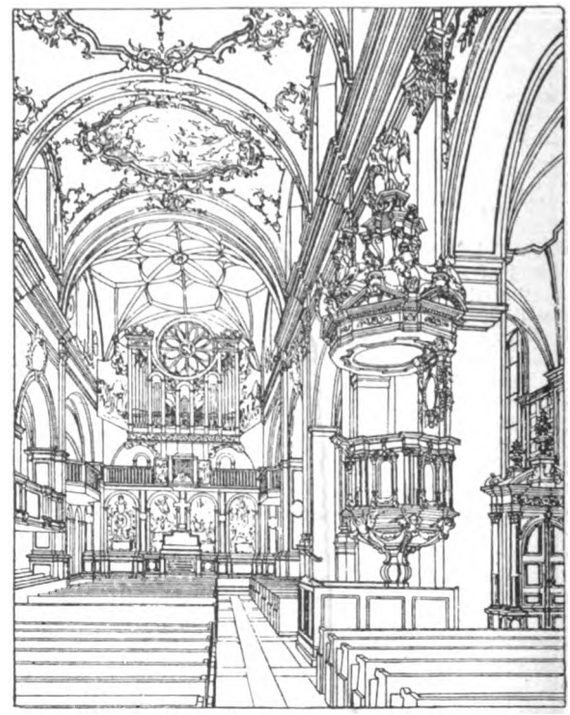
The simplest way in which they provided for the comfort of the congregation was by the furnishing of their churches with permanent seats; and for many years these seats served to distinguish with certainty the "Preaching-churches," held by the Protestants, from the "Mass-churches," which were still in possession of the Catholics. Even where new buildings were erected in Protestant communities, they were at first very similar to small Catholic churches, except in the matter of the fixed seats, or pews.

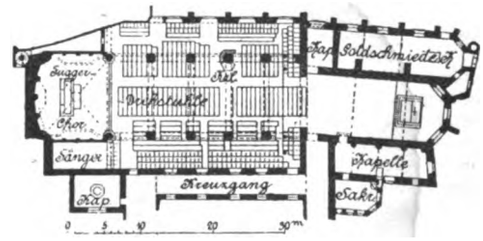
Although the provision of fixed seats in churches is at present so common, among Catholics as well as Protestants, that it does not seem of any special significance, it meant in the sixteenth century far more than it does now. At that time seats for the congregation were not only unknown in Catholic churches, except in the rare



Figs. 4 and 5. St. Mary's Church, Pirna.
Before rebuilding. After rebuilding, 1890-91.

cases of Royal chapels, where seats were allowed to the secular magnates in the nave, as well as to the ecclesiastical dignitaries in the choir, but their presence was incompatible with the ordinary use of the church. In those days, a Catholic church was never closed. It was regarded as the house of God, to which the faithful were entitled to have at all times access, just as they did to an antique temple; and, as in the antique temples, the service of the Deity was carried on in His house, by His priests, without reference





Figs. 6 and 7. St. Anna-Kirche, Augsburg. 1747-48.

to the public. Even to this day, the rubric of the English Church directs that the minister, before the commencement of the morning and evening prayer, "shall cause a bell to be tolled thereunto a convenient time before he begin, that the people may come in to hear God's word and to pray with him"; and the idea that the service at the altar was a function of the priest alone, to which the laity were admitted, but which would go on just as well without them, was that on which the planning of the mediæval churches was based. Moreover, in the larger churches, there were usually several altars, and several priests; and it was common, as it is still in the Continental churches, to have mass going on at two or three altars at once, with, very possibly, a wedding in progress in a family chapel in one aisle, a ceremony of some other sort at the chapel of the Virgin in another aisle, and a modest funeral in a corner of a transept; while, perhaps, a score of penitents might be waiting their turn at the confessionals in the nave. A church worked after this manner, which is still the ideal of zealous priests, requires much freedom of movement; and the provision of fixed pews, sufficient in number to seat a large congregation, would be, even now, an intolerable incumbrance in a great French or Italian church, and would have been even more so in the Middle Ages, when processions, religious "miracle-plays," and similar exhibitions formed an important part of the means by which the priests endeavored to attract the multitude to the house of God. To the Protestants, on the other hand, the idea of a sacerdotal order, consisting of men specially entitled to commune with the Deity, and interpret Divine things to their fellow-men, was repugnant. Although they were willing to leave the reading and preaching, and the administration of the sacraments, to some person selected for that purpose, this person must be chosen by themselves, and regard himself as in all respects a member of the community or congregation. It is curious to note that the early Protestants seem to have found the most satisfactory prototype for their congregational service in the practice of the religious brotherhoods, whose convent churches were scattered all over Europe.

Among the monks of a religious community prevailed that perfect equality which was the principle of the Protestant congregation; their prior, like the Protestant minister, was chosen by themselves, out of their own number, to lead them; and all participated equally in every service. This was just what the Protestants, who had so long seen the laity excluded from such participation in the actual

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Divine service, wished for; and, naturally enough, the ideal of spiritual satisfaction which first occurred to them represented them as sitting, like the monks, ranged in long rows at the sides of the choir of a church, singing antiphonal hymns, while the minister prepared for them the Communion elements at the altar close by. As preaching became a more prominent feature of the Protestant service, it was found more convenient to place the seats transversely to the axis of the church; but some church buildings in Germany, arranged for the Protestant service, have retained until very recent times a seating almost identical with that of the choir of a convent church.

It is hardly necessary to point out that the varieties and divisions which arose in the church brought with them variations in the arrangement of church buildings. The austere Calvinists often abolished the altar entirely; but the Lutherans commonly retained the high altar.

The pulpit, which was usually attached in Catholic churches, then as it still is, to one of the piers of the nave, in front of the choir screen, generally kept its place; but, as the Communion was an important part of the Protestant service, and, in the conventual churches, and some others, the choir was very long, and the high altar therefore far from the pulpit, it was not unusual to leave the high altar, in such churches, to itself, and provide a smaller one, for actual use, in the neighborhood of the pulpit.

It is obvious that the separation of the altar and pulpit, which is still the rule in very many Protestant churches, is a serious inconvenience in buildings with fixed seats. In the old Catholic churches, where, if the laity were admitted to the presbytery at all, they could easily move back to the neighborhood of the pulpit when the sermon began, this separation did no harm; and the central position of the pulpit was favorable for addressing a large audience; but the Protestants, whose fixed seats made circulation in their churches impracticable, were then, as they still are, often subjected to singular embarrassments on account of the inappropriateness of the old arrangement to the new service. With us, it must be confessed, the attempts at a new arrangement have sometimes worse consequences than too faithful an adherence to the old one; and most of us have probably seen those American church buildings in which, at stated intervals during the service, the congregation turns its back upon the altar and the pulpit, to listen to the hymns proceeding from a quartette perched in a balcony over the entrance-door; but, apart from such extravagances, it was in the sixteenth century, as it is in the nineteenth, found difficult to arrange seats for a congregation in such a way that all could see the altar at the east end of the church, and, at the same time, all hear the words of the preacher in the pulpit near the middle of the nave, without placing some of the auditors behind the speaker, or in other unfavorable positions.

[To be continued.]

BOOKS AND PAPERS.

NO book could have appeared in the market at a more opportune time, from the publishers' point of view, than the life [1] of Charles Bulfinch that has been prepared by his granddaughter. For the last three years the inhabitants of New England, of Boston in particular, have been made familiar with the name of the now noted architect through the protracted legislative and newspaper discussions that have attended the efforts to preserve the Massachusetts State-house. It is not often that there falls to any artist to achieve his greatest reputation in consequence of a popular uprising against the projected destruction of his work, and it is doubtful if Bulfinch would ever have achieved the rank which he will hold henceforward as not only one of the earliest of American architects, but as one who was really an artist of refined taste and great technical skill, if it had not been for the attacks of the modern Philistine, dead to all sense of propriety and patriotism, who wished to honor new prophets — and share their shekels.

The reading public in New England and architects everywhere were, then, prepared and disposed to welcome a book which would tell them more of the life and the work of the man about whose real character they had for some time been somewhat vaguely speculating, but we fancy they will lay down Miss Bulfinch's book with somewhat the same feeling of disappointment with which we close its covers. We leave it with a half feeling that the title of the book is rather a misnomer — there is so little of the life of Charles Bulfinch, so few of his letters. From first to last it gives one the impression that it is one of those biographies written "for the family" or "for private distribution," and not for the public at large. There are abundant letters from Bulfinch's ancestors, wife and sons, many of them highly interesting, but all relating rather to the *vie intime* of the writers and bearing very indirectly on the life and work of the professed subject of the biography. Moreover, as these letters cover the period of the Revolution and the War of 1812, it is very disappointing that Miss Bulfinch has made so little attempt to give to the slight story with which she connects her series of letters a local coloring which would serve to bring before us those customs and fashions of the times which, then as now, have so much to do with the moulding of character, so much to do with educating men to the point of expressing themselves by pen or pencil. Boston in the early part of this century was a most interesting and curious town, and its citizens were controlled by laws and swayed by customs which now have become so obsolete that nothing could better describe to us what manner of men our fathers really were than to give some account of the manner in which their daily lives were regulated. Our author has not wholly disregarded this interesting field of inquiry, and it is because we find so much interest in the short excursions she does make into these too-little known fields, that we wish she had devoted a little more attention and time to establishing the background against which her work was to be relieved.

If Charles Bulfinch was one thing more than another, he was a public man and a useful citizen, although he became such through stress of circumstances and not through natural inclination and predilection. No man could have been Chairman of the Board of Selectmen for twenty-one years (1797–1818) without having rendered an appreciable public service to his fellow-citizens, and the fact that they appreciated it and him is shown by the incident that occurred in 1815, when, Bulfinch having for the first time failed of reëlection, all the newly-elected Selectmen resigned their offices, so that a new election might be held and a faithful servant and valued fellow-citizen might be spared the undeserved pain of being discarded against his will. Such a tribute to real worth as is established by this incident must mean a good deal, and yet we do not gather very clearly from this biography what it was that he did or why it was that he was so popular. The other facts that are narrated of his career and his letters themselves give one the impression that Bulfinch was a quietly domestic man, of industrious habits pursued in a rather quiet and leisurely way, not at all such a man as one would expect to find filling the chief place in what was growing to be a large and busy commercial town. And yet this very fact is an indication of the character of the times in which he lived and of the kind of men the citizens of Boston were in those days — days when the distinction between the different classes of men, if not more marked than now, was, at least, more generally acknowledged by high and lowly alike; days when the influence of the Colonial aristocracy had not yet died out and the laws of caste, as understood in England, were still remembered and acknowledged. What chance would a scholarly and quiet architect have in these days of filling the mayorial chair of Boston for twenty-one consecutive years?

Bulfinch's career as a public servant was due to accident, or, rather, to misfortune. Descended from a family possessed of ample means, whose several members had formed the habit of procuring an education in Europe, it was natural that he, too, should follow the example of his elders. After spending a couple of years in travel and some study in France, Italy and England, he returned home without any very precise idea of how he should employ himself, although a natural talent had caused him to give a good deal of attention to architectural matters in the course of his travels, his attention having been directed to architecture before he left home, as he had found his father, a physician, indisposed to allow him to study medicine.

As he himself ingenuously puts it, on his return to Boston in 1787, he "passed a season of leisure, pursuing no business, but giving gratuitous advice in architecture, and looking forward to an establishment in life," — an amiable method of passing the time which many a young architect-to-be has copied between his day and this. Fortunately his income enabled him to wait without fretting, and marriage with a cousin merely added to his means and allowed him to pursue his chosen calling in an artistic spirit and gentlemanly (non-commercial) manner.

After meeting with fair success and reasonable employment during four or five years as an architect, he was led to join some friends in the erection of the noted Tontine Building, which has left its trace in the curvature of Franklin Street, Boston. In this undertaking, which was an ambitious one for those days, Bulfinch appears at the same time in the character of architect, capitalist and contractor, and in view of his successes later in life it is only fair to suppose that the enterprise might have resulted profitably, but for the disturbances that about that time began to arise between England and this country, which affected all credits and which finally ended in the War of 1812. However this may be, the defection of his supporters threw the whole weight of the undertaking upon Bulfinch, who made a manful struggle to carry it on and only desisted when his own fortune and that of his wife and some of his relatives had been swept away and he was left practically penniless.

It was this disaster that introduced him into public life. His friends rallied to his support and he was made Chairman of the Board of Selectmen, but as this position had no salary attached to it, he was also made Superintendent of Police, which assured him the very modest income of $600 per annum. Just here we miss some of that local coloring of which we have mourned the lack. It would be interesting to know how active were the police duties he had to discharge, what was the character of the ordinances he had to enforce, how time-consuming were his duties. In one character or the other he did valuable service and won the esteem of his fellow-citizens, witness his many reëlections. But what and how?

These public functions he discharged practically up to the time he was summoned to Washington to take charge of repairing the Capitol, after its burning by the British in 1814. Of his work in Washington we will say nothing, as Mr. Brown in his interesting papers, narrating the history of the Capitol, has just reached the point where it is necessary for him to take up Bulfinch's work there.

[1] "*The Life and Letters of Charles Bulfinch, Architect*," with other Family Papers. Edited by his granddaughter Ellen Susan Bulfinch, with an introduction by Charles A. Cummings. Boston and New York: Houghton, Mifflin & Co., 1896. Price, $5.00.

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At the time he left Boston for Washington, Bulfinch had just completed the drawings for the Massachusetts General Hospital, which is, perhaps, one of his most typical designs, and had under way the MacLean Asylum, at Somerville, which was destroyed last year to make way for a great railroad freight-yard.

In speaking of Bulfinch as a public man we had in mind, also, the fact that during all his career as an architect, he had to do with a rather unusual number of public buildings, and so while carrying them into execution occupied the position of a *quasi* public servant; while during the years that he passed in Washington he was as much a salaried public official as when he drew his stipend as Chief of Police in Boston town.

It is plain that his public duties did not stand in the way of his building-up a very pretty practice in his chosen profession, and it is equally plain that the growth of his business is due less to personal social qualities than to his real ability as an artist and architect. There are not many of the men who built in those days so many of whose buildings still stand to bear witness to their ability as designers and faithfulness as constructors. A fair number of Bulfinch's buildings still stand and it is only a few weeks ago that one of them, the Library of the Andover Theological Institute (1817–18), was burned. Of many public buildings of note designed by him these may be mentioned:

Massachusetts State-house, 1795; Catholic Church, Boston, 1803; State Prison, Charlestown, 1804–5; Enlargement of Faneuil Hall, Boston, 1805; New North Church, Boston, 1804; Federal Street Church (Gothic), Boston, 1809; University Hall, Cambridge, 1814; Court-house, Cambridge, 1812–14; Insane Asylum, Somerville, 1818; Massachusetts General Hospital, 1818; Maine State-house, 1832. It is interesting to note that just as the State-house in Boston is one of his earliest works, so is the State-house at Augusta his last, and were it not for the records one would be tempted to draw a lesson from the great similarity that exists between his early work and his latest. The fact is, however, that the Augusta building was built in conformity with the expressed preferences of the Legislature, that it should resemble the Boston building, though at a smaller scale.

If we consider the book as the biography of a noted architect, prepared expressly for the members of the profession which he followed, we must hold it somewhat inadequate. In particular it is wanting in the matter of illustration and this is the harder to account for, in that so many of the architect's buildings are still extant and that a portion of the money spent on the series of family portraits could easily have procured adequate illustrations of many of these buildings.

If, however, we look at the work as a history of the Bulfinch *family* we can find it a very interesting and somewhat attractive compilation, and in this light it would be quite proper to include in the body of the work, and not in an appendix, the clever and amusing series of rhymes with which Thomas Bulfinch, son of Charles, and later in life the author of the "*Age of Fable*," "*Age of Chivalry*" and "*Legends of Charlemagne*," celebrated his life as salesman in a hardware store. These rhymes are quite deserving of repetition here:

With the morning's earliest ray
Begins the Lumber merchant's day,
Lumber, Nails and Glass and Lime
Demand his care, demand his time,
And drive him from his bed of down
To scour the streets and range the town,
Alert for purchases and sales
Of Lime and Lumber, Glass and Nails.
But if, by chance, protracted slumber
Keep him from Lime, Glass, Nails and Lumber,
In dreams Lime, Lumber, Nails and Glass
Before his troubled senses pass,
And visions dire of suits and jails
Recall to Lumber, Lime and Nails.
What tho' Lime, Glass, Nails and Lumber
All his leisure hours encumber,
Lumber, Lime and Nails and Glass
Make the long days swiftly pass.
Heavy are Lumber, Nails and Lime,
But heavier far is idle time.
I own that Lumber, Lime and Nails
Seem less fit for maids than males,
And dandy bucks don't care a dime
For tons of Lumber, Nails and Lime;
Yet dear to bucks, and dear to lasses
Their looking and their drinking glasses,
Tho' ours contain no gen'rous wines,
Nor clad in burnished silver shines,
Yet lad and lass shall join our chime—
With Glass sing Lumber, Nails and Lime,
Interpreting, if such their whim,
"Mirror" for her and "Cup" for him,
While sage experience bids me number
All your virtues, Lime and Lumber!
Then the sage, with locks of gray,
Concludes his eulogistic lay:—
"Would you the glitt'ring ore amass?
Stick to Lumber, Nails and Glass;
Or to civic honors climb?
Mount on Lumber, Nails and Lime.
When perplexities encumber
Have recourse to Lime and Lumber;
When fav'ring breezes fill the sails
Ballast the bark with Lime and Nails,
And sing the praise, in varied rhyme,
Of Lumber, Nails and Glass and Lime.

SOCIETIES

MEETING OF THE EXECUTIVE COMMITTEE OF THE AMERICAN INSTITUTE OF ARCHITECTS.

PRESENT at the meeting in New York, August 28th, were President George B. Post, Edward H. Kendall and Secretary Alfred Stone.

Reading of the records of the last meeting omitted.

An illustrated publication, the alternate pages of which were filled by designs of a prominent firm of architects and advertisements, principally of builders and contractors, was submitted to the Committee by a prominent member of the Institute. The publication was considered to be unprofessional, and because of its importance and gravity the matter was referred to the next Annual Convention, with a view to the establishment of a code of ethics which will stamp its disapprobation of the practice.

Mr. P. B. Wight, F. A. I. A., sent to the Committee a copy of the certificate formerly used by the Institute, which was designed by the late Mr. E. J. N. Stent, but it was not thought best to revive its use.

The Secretary was instructed to print in the next *Proceedings* a chronological list of Fellows and Associates of the Institute, indicating those who were deceased and grouping those who founded the Institute in a separate list.

The Secretary was requested to prepare an amendment to the By-laws, giving the Board of Directors power to remit the dues of members who by reason of disability were unable to continue to pay the same.

Voted, That the Treasurer be directed to pay to the Secretary of the National Conference on Standard Electrical Rules the sum of $25.00, the amount agreed to be paid towards the expense of said conference.

The Secretary read a letter from Mr. William Martin Aiken, F. A. I. A., Supervising Architect of the United States Government, expressing his earnest hope and his desire to raise the standard of excellence of Government Architecture, and his willingness and readiness to coöperate with the Institute in any action tending to the equitable and honorable adjustment of the problem of the designing of certain Government Buildings by the best talent available among general practitioners, and in this he believed the present Secretary of the Treasury was also agreed.

The programme of the Nashville Convention as suggested by Mr. W. C. Smith, of Nashville, the Chairman of the Committee, was read and received consideration and suggestions.

The following applications for election as Fellows of the Institute were acted upon favorably: F. E. Kidder, Denver, Col.; J. Monroe Hewlett and Frank H. Quinby, New York, N. Y.

The letter-ballots of June 8th were opened, and Robert E. Dexter, Dayton, O.; J. Graham Glover, Brooklyn, N. Y., and Rudolph L. Daus, Brooklyn, N. Y., were found to be elected.

Adjourned. Attest: Alfred Stone, *Secretary.*

THE ANNUAL CONVENTION OF THE OHIO CHAPTER OF ARCHITECTS, HELD IN DAYTON, OHIO, AUGUST 19, 1896.

The Convention was called to order at 10.30 A. M., by the President, J. W. Yost, of Columbus, O., who read a short paper relating to the business of the Chapter during the past year, and referring to such matters as are of immediate present interest.

The Executive Committee of 1894–5 made a report of the letter-ballot taken, to test the wishes of the Chapter in regard to changing its character and name, as authorized at the last Convention. The report is as follows:

Dayton, O., August 19, 1896.

To the Ohio Chapter, A. I. A.:—

Your Committee, instructed to take a letter-ballot in regard to the re-organization of the Chapter, as per resolution of Mr. Rapp, at the Convention held at Cincinnati, August 20-21, 1895, reports as follows:

Blank ballots have been mailed to all the members of the Chapter. Twenty-four have been returned, of which fifteen are in the affirmative and nine in the negative. Respectfully,

J. W. Yost.
Jas. W. McLaughlin.
Gustave W. Drach.
For the Executive Committee.

An informal discussion of the resolution to re-organize the Chapter followed the reading of the report. Upon motion of Mr. Williams, the consideration of the matter was postponed until the afternoon session.

There being no reports from the other special and standing committees, the President appointed two committees to nominate officers for the coming year. *First Committee*, Mr. Ball, Mr. Burns, Mr. Rapp. *Second Committee*, Mr. Williams, Mr. Drach, Mr. Peters. The Committees were directed to report at the afternoon session.

A Committee was appointed to audit the report of the Treasurer when ready. The Committee consisted of Mr. Dexter, Mr. Rapp, Mr. Drach. Mr. Dexter presented a communication from the Secretary of the A. I. A., requesting a contribution to the fund for the

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payment of necessary expenses incident to the support of the McKaig Bill in Congress, whereupon Mr. McLaughlin moved that if the funds of the Chapter, when the Secretary's report is received, are found to warrant it, the Treasurer be authorized to send a check for $200 to the Secretary of the A. I. A. for the purpose above mentioned. After discussion, the motion was carried unanimously.

Upon motion of Mr. McLaughlin, the Chapter adjourned for luncheon.

At the Afternoon Session the Treasurer stated that his annual report had been mislaid, and upon motion, he was permitted to make a report at a later date.

The two nominating Committees thereupon reported tickets of names for officers for the next year, whereupon a ballot was taken, resulting in the election of the following persons:

For *President*, Luther Peters, Dayton; for *Vice-President*, F. L. Packard, Columbus; for *Second Vice-President*, C. H. Owsley, Youngstown; for *Secretary*, R. E. Dexter, Dayton; for *Treasurer*, E. O. Fallis, Toledo; for *Executive Committee*, C. I. Williams, Dayton, J. W. Yost, Columbus, D. L. Stein, Toledo.

Next place of meeting, Columbus.

Mr. Luther Peters, the President-elect, was called upon for a speech, and responded gracefully, thanking the Convention for the honor conferred upon him, and pledging his earnest support to the work of the Chapter.

Upon motion of Mr. McLaughlin, Mr. R. E. Dexter was elected Secretary *pro tem.*

The question of changing the character and name of the Chapter was then taken up, and after discussion, upon motion of Mr. G. W. Rapp, of Cincinnati, the Convention agreed by unanimous vote to the change proposed, and the Executive Committee was authorized to confer with the Executive Committees of the Cincinnati and Cleveland Chapters, and with the Secretary and Executive Committee of the A. I. A., for the purpose of carrying into effect the resolution above referred to, which was presented by Mr. Rapp and adopted at the annual Convention in Cincinnati, in 1895.

Mr. Walter Forbush, a former member of the Chapter, presented two gavels, the one used by Mr. W. W. Carlin, President of the Western Association of Architects, and the other used by Mr. Richard M. Hunt, President of the American Institute of Architects, at the Consolidation Convention, whereby the two societies were united under the name of American Institute of Architects. On motion of Mr. Fallis, thanks were returned to Mr. Forbush and the gavels accepted.

The President then called the attention of the Convention to the coming Convention of the A. I. A., to be held at Nashville, Tenn., and requested as full a representation of the Ohio Chapter as possible.

There being no further business, on the motion of Mr. Burns, the Convention adjourned, *sine die.*

(Signed) J. W. YOST, *President.*

SKETCH-CLUB OF NEW YORK.

THE first regular monthly meeting and dinner of the Sketch-Club of New York was held on the roof of the Central Building, Saturday evening, September 12; the President, Mr. J. Oliver Cummings occupying the chair. Although the attendance was not quite as large as usual, the lack of members was to a great extent made up by the enthusiasm of those present.

Many of the members have been in Europe during the summer, and one of them, Mr. Robert Kendrick, favored the Club with an interesting account of the places he visited while in England and the condition of architects and their offices in that country. Mr. Sconce, who had the sketching-trips of the past summer in charge, gave his report of the work accomplished by the different classes. Mr. Sconce is very enthusiastic on the subject of out-door sketching and evidently enjoyed that part of his summer's work very much. Mr. Sconce also announced that Mr. E. Eldon Deane had offered to conduct an outing trip at Montvale, N. J., two weeks from date. This class will undoubtedly be well attended.

Mr. Field, Chairman of the Exhibition Committee, also submitted his report. The exhibition was in every way successful. The drawings contributed by those outside of New York were very numerous and added much to the success of the venture. The Club thoroughly appreciates the generous way in which its invitations to outside men to contribute, were accepted.

A vote of thanks was extended to Mr. Henry P. Kirby for his contribution of a catalogue cover.

Mr. Field, on behalf of Mr. Willis Polk, presented to the Club three fine photographs, of some of Mr. Polk's executed work in California; these photos were exhibited at the recent exhibition and were much admired.

The usual Classes of Pen-and-ink rendering, Water-color, Drawing from Life and Architectural Research, will be carried on under very competent leadership.

The chairmanship of the Architectural Research Class, recently resigned by Mr. Hirsh, has been given to Mr. Sconce and the class in his charge will commence their studies during the coming week.

A liberal sum of money was voted for the carrying out of a scheme of decoration for the Club's quarters and every effort is to be made during the coming season to make the Club's home as comfortable and attractive for its members as possible.

Meeting adjourned at 10.30 P. M.

HARRY P. KNOWLES, *Recording Secretary.*

TEXAS STATE ASSOCIATION OF ARCHITECTS.

THE Annual Convention of the Texas State Association of Architects was held in the gentlemen's parlor of the Driskill Hotel, at Austin, on September 5, a fair attendance being on hand. The principal business of the meeting was the election of officers for the ensuing two years, which resulted as follows: J. Reily Gordon, of San Antonio, *President;* Burt McDonald, of Austin, *First Vice-President;* F. S. Glover, of Houston, *Second Vice-President;* H. A. Overbeck, of Dallas, *Secretary* and A. A. Meyer, of Fort Worth, *Treasurer.* After the election of officers an adjournment was taken for dinner, and in the afternoon there was a meeting of the Executive Committee in which numerous questions of the greatest importance was discussed.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

FIREPLACE IN THE MAIN CARD-ROOM: METROPOLITAN CLUB-HOUSE, NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print, issued with the International and Imperial Editions only.]

A GROUP OF SUBURBAN HOUSES. MR. W. A. NORRIS, ARCHITECT, CAMBRIDGE, MASS.

PUBLIC SCHOOL BUILDING, MONONGAHELA CITY, PA. MESSRS. BARTBERGER & EAST, ARCHITECTS.

RESIDENCE NO. 5251 WASHINGTON AVE., ST. LOUIS, MO. MR. F. C. BONSACK, ARCHITECT, ST. LOUIS, MO.

HOUSE OF F. A. DREW, LINDEN AVE., ST. LOUIS, MO. MESSRS. BARNETT & HAYNES, ARCHITECTS, ST. LOUIS, MO.

THE H. M. WARREN SCHOOL-HOUSE, WAKEFIELD, MASS. MR. C. E. PARK, ARCHITECT, BOSTON, MASS.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXIX: THE COLONNADE: PARK OF VERSAILLES, FRANCE.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXX: A WOODED WALK IN THE GARDEN OF THE VILLA BORGHESE, ROME, ITALY.

A GROUP OF DOLPHINS.

[Additional Illustrations in the International Edition.]

ROMANESQUE PAVILION IN THE HISTORICAL GROUP OF THE MILLENNIAL EXHIBITION AT BUDA-PESTH, HUNGARY. M. ALPAR, ARCHITECT.

[Copper-plate Etching.]

COUNTRY HOUSE, BLASEWITZ, NEAR DRESDEN, SAXONY. HERREN, SCHILLING & GRABNER, ARCHITECTS.

[Gelatine Print.]

DOORWAY OF SAME HOUSE.

[Gelatine Print.]

RESTAURANTS ON THE STRAND, LONDON, ENG.

NOTES AND CLIPPINGS

M. JOSEPH THOME. — The death of M. Joseph Thomé, formerly a stonemason, and later a millionaire, is announced from Paris. He is the man who, under the inspiration of Napoleon III and the guidance of Baron Haussmann, carried out the vast building schemes which changed old Paris to the new one, and had vast political as well as æsthetic influence upon the city. Thomé was born in Provence, and

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went to Paris to look for work over sixty years ago, when Baron Haussmann was the newly made Prefect of the Seine. The two men had already met in Bordeaux, and the Baron, finding the workman full of ideas, consulted him about the regeneration of the Chaillot, Trocadéro and Marbœuf districts. Thomé showed the vigor and audacity needed for carrying out the imperial plans, and was allowed to draw up a plan, which Haussmann adopted, for opening up these districts with main and secondary streets. It was adopted. Thomé at once speculated on money lent in return for information he was able to give to great financiers. He bought acres on acres of waste ground and slum habitations without end, and became the greatest holder of ground for building sites in what is now the most fashionable west-end part of the capital. This was in 1855. As the boulevards were opened, Thomé lined them with palatial structures. The task in which he himself took the greatest pride was the calling into existence of that magnificent "Quartier de l'Arc de Triomphe," that has no rival in any other capital. Here he labored on long after the empire and Baron Haussmann had sunk into dust and ashes, and here he died worth a couple of millions sterling, and occupying a sumptuous mansion in the Avénue d'Jéna. It is a pleasing trait in M. Thomé's character that he never forgot his poor kinsfolk in the south, nor yielded to the temptations of social snobbery. Thomé and his wife never aspired to be "genteel," much less aristocratic. They lived in handsome style, entertained hospitably, and kept open house for relatives and old friends who had or had not risen in the world. Though Thomé did so well under the empire, he was a republican, but of a moderate type. To the end he looked the stonemason, and in the country he always wore a blouse on week days. One of his daughters married M. Chiris, the great Grasse distiller of scents from flowers. She had a dowry proportionate to her father's wealth. Her daughter in turn married in 1894, President Carnot's son Ernest. Thomé's two sons are, in point of wealth and position, magnates. One of them is a barrister and the other carries on the business of contractor. The personalty of the former mason is valued at over £2,000,000. — *New York Times, September 7.*

Chichester Cathedral and Cromwell's Troops. — The Saints, it seems, began their war against storied urn and animated bust. "They left," we are told, in Chichester Cathedral, "not so much as a cushion for the pulpit nor a chalice for the Blessed Sacrament." The commanders having in person executed the covetous part of sacrilege, they left the destruction and spoiling part to be finished by the common soldiers. As they broke down the organ and demolished the pipes with their pikes they cried out in scoff: "Harke! how the organs goe." The communion rails, the table itself, the Decalogue, the service books, and the pictures having been destroyed, these "godly" inquisitors, as was meet, returned thanks for what they had been permitted to do, and some "painful" member of the crew delivered a discourse suitable to the occasion. After this the Saints raced about the church with their drawn swords, defacing the pillars, hacking and hewing the seats and stalls, scratching and scraping the painted walls, "Sir William Waller and the rest of the commanders standing by as spectators and approving of these impious barbarities." Then followed the ransacking of the sub-deanery church in the north transept, "the chalice being broken into bits for division of spoil, and the Bible marked in divers places with a black cole." The eyes of a statue of poor Edward VI were knocked out by a trooper, who alleged as his reason for doing so that he and his prayer-books had been the cause of all the troubles. Worse than this even was the plundering, under the direction of Sir Arthur Haselrig, who had been informed of its whereabouts by some treacherous Judas, of the church plate in the Chapter House. "Here troopers with crowes of iron hacked the wainscot about the room. As the work went on he cried: 'There, boys! there, boys!' 'hearkee, hearkee!' 'It rattles! it rattles!' His tongue was not enough to express his joy; it was of attendance at his very heels by dancing and skipping. Mark what music it is lawful for a puritan to dance to." All the adjoining buildings were sacked, the Market Cross was robbed of the statues of its founder and other bishops, and of St. George, the patron saint of the City Guild. Dean Stephens tells us that a memorial of the siege was long preserved on the hall table of the house in Canon Lane occupied by the late Canon Ashwell. It was a cannon ball, discovered while the foundations of a new house were being laid, and its finder labelled it with these words: "Presented by Sir William Waller to the Dean and Chapter of Chichester, December, 1642." — *Gentleman's Magazine.*

Successful Preservation of Indian Forests. — India, says a contemporary, would scarcely be looked to for an example of forest preservation, but that country has perhaps the finest national forest policy of any in the world. Before regulations for the conservation of growing timber had been devised and put in force, its forests had been consumed as recklessly as those of the United States, and that is putting the case as strongly as is necessary for emphasis. Fires destroyed, timber for use was cut lavishly and without regard to economy, and the forests were disappearing under careless treatment. Through the present policy India has placed 80,000 square miles under permanent regulation, while 50,000 other square miles are in process of settlement. A large number of trained men now constitute a force to protect the forests. The revenue from these reserves is expected to equal the expenditure for the entire preservative machinery. The product of the forests brings in a liberal and growing surplus. This policy has been in operation for thirty years and has been a great success. — *Northwestern Lumberman.*

The Column of Roland at Weiten. — A curious monument of former centuries which had been doomed to destruction has been saved by the action of an energetic burgomaster of a small Austrian town. In quaint old Weiten, situated in the lower part of the so-called forest quarter of Lower Austria, there is still to be seen on the market square one of the ancient "Columns of Justice," crowned by a figure of Roland with his knightly emblems. In the old days a chair was provided beneath the column for the justice of the peace of the district. Attached to the column was also the pillory, and bodily punishments, like whipping, were also administered beneath the statue of Roland. The column in Weiten is known to have been erected and in use early in the thirteenth century. That it was even in those early times of great necessity is best proven by the action of Duke Albrecht IV, who in 1402 organized the now famous "War of Justice," travelling from one castle of the robber-barons to the other, reducing their buildings to ashes and making short work of their occupants, whether nobles or not, by sitting in Court on the market square and meting out severe justice under the shadow of the old column of Roland. The base having become rotten, the old column grew shaky, and there was some talk of tearing it down altogether. This action was vehemently opposed by the burgomaster, who would not have a monument which had stood in its place for almost seven hundred years abolished without at least an attempt at restoration, the expense of which he eventually paid for himself. The statue is still in excellent condition, and the woodwork beneath has been replaced by strong oak timber, so that the monument may now endure for several centuries more. — *Philadelphia Record.*

Sundry Errors in estimating the Cost. — The estimated cost of the Manchester ship canal was $28,750,000. Nearly $80,000,000 was spent before the canal was ready for business. The international commission reported in 1856 that the cost of digging the Suez Canal would certainly not exceed $40,000,000. It had cost $94,500,000, to say nothing of Egypt's gratuitous building of light-houses, dredging of the harbors, advance of money without interest and gift of forced labor, the whole amounting to $20,000,000 more. Engineers spent a year collecting data for their report on the Congo railroad, which they asserted could be built for $5,000,000. They now say that the total cost will be from $12,000,000 to $15,000,000. The egregious underestimate of cost of the Panama Canal nearly swamped that enterprise before wholesale stealing completed the ruin. The forts on the Meuse River, estimated at $4,500,000, cost $16,000,000; the Corinth Canal cost $12,000,000, instead of the estimated $6,000,000; a harbor and a railroad on the Island of Reunion cost $13,500,000 instead of $6,800,000; the Senegal Railroad, which was to be completed for $2,600,000, absorbed $9,000,000, and the Langson Railroad, in Tonkin, which was to open a conquered province for an expenditure of $500,000, bled the French treasury to the tune of $4,367,790. — *Army and Navy Journal.*

A Profitable Cycloramic Speculation. — Years ago, when cycloramas were all the rage in European cities, De Neuville and Detaille collaborated in painting the enormous panoramic picture of the Battle of Rézonville. The work was exhibited in several cities; but finally it became a back number, the receipts fell off, and it was decided to sell out. A shrewd speculator bought the canvas, and cut it up into more than a hundred small pictures. Two of the most dramatic large groups were preserved, showing "The Council of War between General Bourbaki and Marshal Canrobert," and "The Death Ride of Rézonville." These two compositions have been bought by the French Government for the historical museum at Versailles, at a price which is almost equal to that given for the entire panorama by the speculator. There remain 135 pictures of various sizes and degrees of importance, from single heads to large groups, which are either sold or to be sold. — *Boston Transcript.*

Explosive Brick Street Pavements. — An extraordinary incident is reported from Terre Haute, Indiana, by the City Engineer, Mr. G. H. Simpson, M. Am. Soc. E. A street of this town was paved with brick five years ago, the joints being grouted up. The work was done partly during the winter, being finished in early spring. The foundation consisted of broken stone eight inches thick, above which was a layer of sand two inches thick. At the end of last July with the thermometer standing at about 100° Fahr., a section of the pavement rose like an arch from its foundation, and though water was turned on to it, and openings made to let out any possible accumulation of gas beneath, it maintained its position unaffected. Men were then put to work to repair the pavement, but hardly had they removed the swollen section when, with a loud report, another section of the pavement rose in a similar manner to a height of seven inches to nine inches. — *Engineering.*

The Destruction of the Colosseum. — The Colosseum was made to stand forever. If we gaze at it from the east side, where it appears still intact, we are forced to exclude the possibility of a spontaneous collapse of such a substantial structure. Yet the repeated concussions of the earth in the fifth century may have caused a crack or rent like the one which cuts the Pantheon on the side of the Via della Palombella. If such an accident occurred in the Pantheon in a solid wall fifteen feet thick, built by such an experienced architect as Hadrian, it is even more likely to have happened in the Colosseum, the outer belt of it being of stones without cement, and pierced by three rows of arcades and one row of windows. The equilibrium once destroyed, the results are obvious, especially if we remember how quickly arborescent plants and trees take root and prosper in the dry soil of an abandoned building. The stones on the edges of the crack must have been lifted or wrenched from their sockets by the roots wedging themselves into the joints and acting as levers. Readers familiar with the vignettes of the Colosseum of the sixteenth and seventeenth centuries will remember how exactly they represent this process of disintegration of the edges, stone by stone. When Pius VII determined to build the great buttress to support the edge of the outer belt on the side of the Via di S. Giovanni in Laterano, he was obliged to employ convicts serving for life, promising them a reduction in the term of imprisonment if they succeeded in propping it up. The danger was such that the forest of timber used in the scaffolding could not be removed while the masons were progressing with their work, but had to be left imbedded in the thickness of the supporting walls. — *Prof. Lanciani in the October Atlantic.*

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WHAT THE ARCHITECT SHOULD KNOW ABOUT HOUSE-FINISHING.

THE Murphy Varnish Company of Newark, N. J., have brought together in a neat little pamphlet a few of the many instructive bits of advice and recommendation that they have been publishing in this journal for several years. The shrewd intelligence that the writer of these weekly exhortations manifests proves he is possessed of intellectual resources of no mean order.

We give below a few extracts from the pamphlet in question:

Whoever wants a *perfect finishing material* should know where to get it; and know that it is not to be had in the bargain-counter way.

The architect must not only know what patterns of mantel and window, and what colors of wood will properly decorate a given room; he must know what make and grade of varnish will bring out and preserve the full beauty of those various woods. For a given wood, in a given place, he must know how many coats of varnish to put on, what time to allow for drying, how the rubbing should be done, whether shellac ought to be used; just as he must know how to lay a foundation or spring an arch.

I. What a specification is not.

1. A simple requirement that "first-class varnish" shall be used is *not* a specification. Suppose the architect merely demanded "first-class stone" for the walls of a building — limestone? brownstone? granite? what? Any first-class stone, however, would make a solid wall; but any one of a dozen (hundred?) first-class varnishes might utterly fail in the work of architectural finish.

2. A mere demand for the varnish of some particular firm — "Murphy's varnish," for instance — is *not* a specification. Murphy makes varnishes that cost less, and varnishes that cost more, than his architectural varnish; but they are not the proper varnishes for house-finishing. To merely add the maker's name is no more definite than to require that the unspecified stone shall be gotten from a particular State.

3. To write a specification and destroy it is *not* a specification. Here are samples: "Murphy's Transparent Wood Finish or something equally good"; "T. W. F. or its equivalent." Suppose your doctor wrote a prescription and added "or something equally good" — leaving the druggist to decide whether he will give you the medicine suggested or some other. If the druggist really prescribes, why should you pay the doctor?

II. What a specification is.

1. A specification *must* give the maker's name. No two manufacturers make the same article. For instance: "Murphy Varnish Company's."

2. A specification *must* give the brand name, just as you would designate the grade of shoes or cloth. For instance: "Transparent Wood Finish."

3. A specification *must* define the special finishing material for a given work. For instance: "T. W. F. Interior" for inside work, and "T. W. F. Exterior" for outside work.

4. A specification *should* make precise demands as to the method of doing the work. For instance:

a. Fill the grain thoroughly with a coat of Mineral Paste Filler, properly thinned. Rub off well, and allow twenty-four hours to dry. Omit this from close-grained woods.

b. Apply a thin coat of shellac on all interior work (except bath-rooms and places exposed to water), and, when dry, rub lightly with No. 0 sand-paper.

Never use shellac on bath-rooms, laundries, or outside work.

c. Apply two or three coats of varnish on inside work: (never less than three coats on bath-rooms, laundries and all places that get no shellac.) Three coats on all outside work. Allow each forty-eight hours to dry. Flat each coat with No. 0 sand-paper, curled hair, or moss, before applying the next coat.

If a bright finish is desired, leave the final coat glossy. If a dull finish is desired, rub carefully with fine pumice and water in three or four days.

It is Murphy's duty to make sure that his operatives produce the kind of varnish he orders, not merely to theorize on varnish. It is the architect's duty to superintend the building — to make sure that all specified materials, stone and brick, and iron and glass, and wood and varnish, are used — that the owner gets what he pays for. . . .

Every architect knows that any failure to make the specification clear and positive, concerning the use of the right varnish, means the use of cheap stuff, the spoiling of ornamental woods, the disappointment of the owner — then, . . .

1. It is a common saying in politics that measures may be judged by the character of the men who advocate them. Every dishonest painter objects to specification. All he asks is that he may be "held to results." Then he can charge two-thirds the price of T. W. F., use a varnish that costs one-third; tickle the owner's "nearness," and put on a shine that will last till the bill is paid.

2. Every reputable painter wants an exact specification, for that will shut out the "tramps" and enable him to do a good job at a living profit.

3. All painters understand that a make-believe specification — "something as good," "its equivalent," "first-class material," — is a formal and dignified announcement of their privilege to use what they like, just so it shines till the owner accepts the house.

The worst of all is to lump the finishing with the carpentering, and allow the carpenter to sub-let to the lowest bidder.

That takes away the last semblance of responsibility. Of course the carpenter will write no specification for varnish. Of course the lowest bidder will be the man who calculates on using the cheapest stuff in the market. Of course, each of these gentlemen charges a profit up to the owner, who must also pay the architect for superintending the work he neglects.

Make a perfectly clear and positive specification, both for the varnish and the varnishing. If any man wants a cheap job, specify cheap varnish. That will be entirely honorable. If results are bad, the painter may clear his good name by producing the contract.

Treat the finishing trade with the respect it deserves, by letting contracts directly to reputable painters, and refusing the bids of those who need extra watching. If there be an unusually large proportion of frauds in the finishing trade, it is because they have been called into it by the — well, by the *careless* methods of architects. The way to get rid of them is to deal squarely with the trade. A wit has wisely said that "lips and cheek surrender to backbone."

When Ruskin demanded certain things of the English architects, a few of them cried out "impossible." "O-ho," said he, it is not the impossibility of it that I am talking about, but the *indispensability* of it." The right method is indispensable to good results in finishing. It is indispensable to honest dealing with owners. It is indispensable to the reputation of painters. It is indispensable to the progress of architecture and the good name of architects. It is indispensable to the manufacture of fine varnish itself. What is indispensable, all round, is not impossible. It is thoroughly and easily practicable — with a little stiffening of the backbone.

AN IMPROVED BELL-TRAP.

W. GORDON MILLER Co., Pittsburgh, Pa., desire to state that the demand for their "Improved Bell-Traps" is assuming unusually large proportions, and that they have been compelled to leave off some important

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departments of their business to cope with the increasing demand, working night and day to fill orders.

They claim that the advantages and improvements in the construction of this trap, place it so far ahead, that it is absolutely without a rival in the market to-day.

They mention that chief among the many advantages of Miller's Improved Bell-Trap is the fact that every trap has its cover secured by non-corrosive screws to body of Trap, thus overcoming the heretofore inevitable difficulties of the loose cover, which being so easily lifted off is often carried away or laid aside or broken, so that the premises is left without any trap protection a good part of the time, and the stopping-up of the sewer is not infrequently traceable to this condition of things, but the cover of their "Improved Trap" will not only remain firmly in place when stepping on it, etc., but unless there is absolutely occasion to remove it, it will always be found in its place and the trap kept in action.

Another immense advantage of "Miller's Improved Bell-Trap is the *wash* of the Trap. It is especially constructed with this object in view, and its water reaches the bottom of trap with such force and vigor that the fixture is as nearly as can be made a self-cleaner, so that little or no sediment can remain in the bottom, but is forced by the action of the water out through the trap into the drain or sewer, hence requiring little or no attention to keep in running order.

Still another very important feature of the Improved Bell-Trap is in the cover, which has four different centre supports, by hook arrangements which grip the outlet pipe, so that the part of the old-style trap which is always considered the weakest is in the Improved Trap made the strongest part, thus adding immensely to the life and service of the fixture.

They also assert that notwithstanding the value of the above improvements and the machine work necessary in the manufacture of their traps, that they are actually placing them in the hands of the plumbing fraternity at the same price as the old-style Bell-Trap which never had any improvement since antediluvian times. Made in all sizes from 6" to 16". Circulars and price-lists will be sent to all parties requesting same and mentioning this paper.

W. GORDON MILLER CO.,
PITTSBURGH, PA.

VANDERGRIFT, PA., A NEW INDUSTRIAL TOWN.

JANUARY, '86, says the Apollo Iron and Steel Company, we took over the galvanized-iron business and works at Apollo, as they then were.

The works were of little value, but quite as good as the business. We reconstructed both as soon as we could, but gradually, and have carried them on for ten years as well as we could within limitations imposed by the fact that we had to extend our works a little this year and a little next year without any plan, and our place was too small to build on properly, if, indeed, we had been ready to build systematically. We had to build and keep on building, but couldn't build with a plan. We did put in the best machinery, such as we could; but we hadn't room for modern facilities.

Nevertheless, we made there, for several years, the best and largest output of galvanized-iron produced in the world; and, with it, got and kept the lead in the American market.

We refer to the past for the sake of affording some indication of the immediate future; and this is for its bearing on Vandergrift.

Ten years ago we had strong competition. There were at least two makers of galvanized-iron ahead of us in every way. Two-day we have no competition on equal terms, or on nearly equal terms.

If, beginning small and behind at Apollo ten years ago, we got to the front in a few years with strong competition, and Apollo grew with us, all the more shall we now beginning again with the lead at the start, with our product preferred by both consumers and workers in galvanized-iron, with readier sale at higher prices on shorter credits, with costs in our favor, with larger resources from current trade, with facilities more than equal to any possible sale, and the means of extending indefinitely — all the more shall we grow, and Vandergrift with us.

But Vandergrift is a creation at first, not a growth. It must furnish homes almost immediately for a thousand men and their families. Growth will begin at about 5,000 inhabitants.

Our new Works at Vandergrift will be ready to start in September; such Works do not elsewhere exist. They are planned and built all at once, with unlimited space and time, with the latest approved devices and systems of work; in short, we begin anew with the help of our own experience, as well as of much observation of similar Works in other parts of the world.

Almost all works are built gradually, pieced out and patched. Our Works at Apollo were built in that way. We have built these new ones at Vandergrift, partly for present advantage in plan and system of work, and partly for future development. We have provided room for larger Works than we need at present, and these can be added without impairing the plan.

We have never been disposed to engage in any business outside of our regular work, but we had to begin this town; or else we should have the usual mill-town around our Works, for the employés must live near by.

What sort of a town should it be? In average towns and cities, the people are sick a certain per cent of the time, and die at a certain average age. By taking a little pains, we could have a town in which our employés and their families would be a great deal more comfortable, be sick not half so many days in the year, live twice as long (if you count children), and be stronger. Which sort of a town should it be? We chose the clean one.

The essential difference between the sanitary and unsanitary town is in drainage and sewerage; one is well drained and sewered; the other is not. But there are great conveniences that commonly go with drains and sewers, that cost not near so much if built when the town is laid out, such as pavements, sidewalks, waterworks, gas-works, electric-works, etc.

All these things are provided in cities; but how? One after another, separately, interfering with one another, at heavy cost; the work is never done, and the cost is never done with, in cities. Besides, the work is so done, in cities, that "modern improvements" do a great deal of harm as well as good, and entail no end of expense for repairs. The expense is not thought of, because it is paid by the city; but where does the city's money come from? These things are all done at once and beforehand at Vandergrift; well done, too. They will serve their full use; and the cost of maintaining the various systems will be as light as possible.

But neither map nor picture can show how good a site we have. When you look at the place as it is, you see the slope to the north and east to the river, the Works on the flat below, the river, and the tumble of wooded precipitous hills on the other side. It seems formed by nature for just this use. The Works are under the foot of the slope, and, but for the chimneys, scarcely in sight from the town. The Works are along the railroad, sufficiently high to be safe from floods; and the town on the slope above, and plateau still farther above and back. We have the advantage of natural drainage, though we by no means rely on that; and the view from all parts of the town takes in the hills and ravines across the river.

The town-plan is by Mr. Frederick Law Olmsted, the architect of the general plan of the World's Fair at Chicago.

Our water comes from artesian wells in the hills: a source that assures an abundance of good clean water.

The preliminary work is well advanced. The grading was mostly done in the winter. The streets and sidewalks and parks will be mostly done this summer. The underground work is going on. By fall, a good many people will be in their houses and have full use of the streets, sidewalks, sewers, drains, water, natural gas, electric-light, etc. The streets will be paved with vitrified brick, the sidewalks curbed and paved; the sewers are under the streets; but the other pipes are under the alleys, not in the streets, to avoid disturbing pavements.

All this public work we have done ourselves. It is better done, and cheaper, than such work is ever done, or can be done, by the people. We have done it just as we build our own Works and manage our business.

Besides these public works, there are private beginnings. A planing-mill will be ready by the middle of summer. Six three-story brick buildings October 1st: the ground floors to rent for stores, the upper floors for dwellings. Churches are forming themselves — we give the ground for a church and pay half the cost of the church. A Building Society, started some months ago, is going on well; institutions of several sorts are taking shape. By the end of the summer, the town will have better provision for most of the wants of its people than any existing town of ten-thousand inhabitants. This is written in June when events are ripening fast; there will be more done in the next six months than we know beforehand. Almost the only advantage of older towns is the size of their trees; of course, ours are mere stubs — we have a fine woods near by, however.

We have started the town to enable our employés to live in comfort and health, and to save their money. It is a place where a man can set up and maintain as good a home as he is fit for.

In the beginning, the town will consist of our employés and the tradesmen to serve them in various ways; but we are already receiving a stream of inquiries from strangers who happen to hear of the new provisions for living at Vandergrift. Evidently there is general interest in it.

Other Works will come, if we choose to sell them the land — we have two or three times as much as we want for ourselves, adapted to Works and to nothing else, as good as that we have built our own Works

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Cathedral of St. John the Divine.

New York, N. Y.

WE offer the illustrations of the competitive designs for the great Protestant Episcopal Cathedral, now building on Bloomingdale Heights, New York, submitted by the following Architects:

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on — flat and along the railroad. The town ready-made will attract them. We should not have gone out of our way to do such a job as this, and tie up money in lots and streets, and pavements and pipes, if we could have found a suitable town. And here it is ready-made, and as good for somebody else as it is for us; it is better for others; they haven't got to start it — no one likes to begin a settlement.

Apart from works and mills altogether, the town will attract inhabitants. Nowhere else are such comfort and safety and ease at any such cost. We mistake the shrewdness and thrift of people in general, if there is not a continuous active demand for property here at once.

APOLLO IRON & STEEL CO.,
PITTSBURGH, PA.

THE MITCHELL WATER-HEATER.

WITHIN the past few years the system of heating residences and greenhouses by the circulation of hot water has become so popular that manufacturers have given much attention to the invention and bringing out of new designs in water-heaters. The result is that many water-heaters of faulty construction have been placed in the market and backed up by firms with large capital, who, by extensive advertising, have made many sales. That such faulty construction has been adopted by so many manufacturers of water-heaters, is not due to a lack of knowledge as to what was required in a heater, but largely for commercial reasons. Makers of hot-air furnaces felt the need of a water-heater to retain their trade with the heating public, and have adopted a construction of water-heaters which could be made with such foundry facilities as they already possessed, trusting to their selling facilities to place their goods upon the market.

In designing the Mitchell Water-heater we did not consult the resources of our foundry, or the class or kind of work in water-heating turned out by foundries in general, but designed a heater based upon the truest and best principles, trusting to our ability to bring the foundry up to a point where we could successfully produce the work as designed.

After perfecting our model and securing our patents, we consulted some of the most prominent foundry and heater men in the country, and while all admired and spoke in the highest terms of our Heater as being the most perfect of any in the market, they yet doubted the feasibility of making so difficult a casting as the "flue section" of the Mitchell Heater, except at such a cost as would virtually debar its use.

We refused, however, to give up a good and effective construction because it required unusual work and skill to produce the castings required. We made our patterns and put them in the foundry, and after considerable effort and work, and a loss of some castings, we gradually educated ourselves and our workmen up to the requirements of the work, so that to-day we put the Heater in the hands of the consumer, perfect in design and construction, and at a cost as low as any reputable Heater in the market.

MITCHELL HEATER CO.,
POUGHKEEPSIE, N. Y.

AS TO REPUTATION.

YOU may handle a good heater. But is the heater one that is known to be good? Reputation means a great deal in heating boilers.

The matter of heating is so little understood by the general public that the reputation of a heater goes a good way with the average consumer. It is easy to sell a boiler of known merit. And the dealer's profit on such a boiler is usually greater than it could be on one that is not so well known. Frequently our customers are awarded contracts in spite of the fact that their competitors have put in lower bids. The consumer is certain that our heaters are all right, and he willingly pays for that certainty. Oliver Schlemmer, of Cincinnati, who is one of the largest heating contractors in the country, and who handles our heaters, writes as follows:

"The superior qualities of your Heaters are so fully recognized and my patrons have praised them so highly that in many instances I have been awarded contracts regardless of figures, where my competitors were quoting considerably lower prices."

If you consider the matter seriously, the above ought to appeal very forcibly to your good sense and judgment.

Let us remind you that, besides our line of Steam and Hot-Water Heaters, which is the largest in the world, you can get from us anything in the line of radiators, valves, pipe, fittings, tools, etc., so that you need open but one account. Our facilities are such that we can fill all orders with promptitude. Write us for terms.

We have in press the second edition of our "Fitters' Hand-Book," which will be much larger and more valuable than the last edition. The book has been carefully compiled by our chief engineer and is in every way complete. We shall be glad to send you a copy if you will write for it.

AMERICAN BOILER COMPANY,
NEW YORK, N. Y.

INFRINGEMENT WARNING.

NEW YORK, N. Y., July 25, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — It having come to our notice that various parties are offering to build what purports to be Babcock & Wilcox boilers, we wish to notify all whom it may concern that no outside concern has been authorized to build our boilers.

Without infringing a large number of patents owned by us, no one can build other than a very antiquated form of Babcock & Wilcox boilers, and buyers are warned to be on their guard in dealing with any one who offers them. Very truly yours,

THE BABCOCK & WILCOX CO.

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departments of their business to cope with the increasing demand, working night and day to fill orders.

They claim that the advantages and improvements in the construction of this trap, place it so far ahead, that it is absolutely without a rival in the market to-day.

They mention that chief among the many advantages of Miller's Improved Bell-Trap is the fact that every trap has its cover secured by non-corrosive screws to body of Trap, thus overcoming the heretofore inevitable difficulties of the loose cover, which being so easily lifted off is often carried away or laid aside or broken, so that the premises is left without any trap protection a good part of the time, and the stopping-up of the sewer is not infrequently traceable to this condition of things, but the cover of their "Improved Trap" will not only remain firmly in place when stepping on it, etc., but unless there is absolutely occasion to remove it, it will always be found in its place and the trap kept in action.

Another immense advantage of "Miller's Improved Bell-Trap is the *wash* of the Trap. It is especially constructed with this object in view, and its water reaches the bottom of trap with such force and vigor that the fixture is as nearly as can be made a self-cleaner, so that little or no sediment can remain in the bottom, but is forced by the action of the water out through the trap into the drain or sewer, hence requiring little or no attention to keep in running order.

Still another very important feature of the Improved Bell-Trap is in the cover, which has four different centre supports, by hook arrangements which grip the outlet pipe, so that the part of the old-style trap which is always considered the weakest is in the Improved Trap made the strongest part, thus adding immensely to the life and service of the fixture.

They also assert that notwithstanding the value of the above improvements and the machine work necessary in the manufacture of their traps, that they are actually placing them in the hands of the plumbing fraternity at the same price as the old-style Bell-Trap which never had any improvement since antediluvian times. Made in all sizes from 6″ to 16″. Circulars and price-lists will be sent to all parties requesting same and mentioning this paper.

W. GORDON MILLER CO.,
PITTSBURGH, PA.

VANDERGRIFT, PA., A NEW INDUSTRIAL TOWN.

JANUARY, '86, says the Apollo Iron and Steel Company, we took over the galvanized-iron business and works at Apollo, as they then were.

The works were of little value, but quite as good as the business. We reconstructed both as soon as we could, but gradually, and have carried them on for ten years as well as we could within limitations imposed by the fact that we had to extend our works a little this year and a little next year without any plan, and our place was too small to build on properly, if, indeed, we had been ready to build systematically. We had to build and keep on building, but couldn't build with a plan. We did put in the best machinery, such as we could; but we hadn't room for modern facilities.

Nevertheless, we made there, for several years, the best and largest output of galvanized-iron produced in the world; and, with it, got and kept the lead in the American market.

We refer to the past for the sake of affording some indication of the immediate future; and this is for its bearing on Vandergrift.

Ten years ago we had strong competition. There were at least two makers of galvanized-iron ahead of us in every way. Two-day we have no competition on equal terms, or on nearly equal terms.

If, beginning small and behind at Apollo ten years ago, we got to the front in a few years with strong competition, and Apollo grew with us, all the more shall we now beginning again with the lead at the start, with our product preferred by both consumers and workers in galvanized-iron, with readier sale at higher prices on shorter credits, with costs in our favor, with larger resources from current trade, with facilities more than equal to any possible sale, and the means of extending indefinitely — all the more shall we grow, and Vandergrift with us.

But Vandergrift is a creation at first, not a growth. It must furnish homes almost immediately for a thousand men and their families. Growth will begin at about 5,000 inhabitants.

Our new Works at Vandergrift will be ready to start in September; such Works do not elsewhere exist. They are planned and built all at once, with unlimited space and time, with the latest approved devices and systems of work; in short, we begin anew with the help of our own experience, as well as of much observation of similar Works in other parts of the world.

Almost all works are built gradually, pieced out and patched. Our Works at Apollo were built in that way. We have built these new ones at Vandergrift, partly for present advantage in plan and system of work, and partly for future development. We have provided room for larger Works than we need at present, and these can be added without impairing the plan.

We have never been disposed to engage in any business outside of our regular work, but we had to begin this town; or else we should have the usual mill-town around our Works, for the employés must live near by.

What sort of a town should it be? In average towns and cities, the people are sick a certain per cent of the time, and die at a certain average age. By taking a little pains, we could have a town in which our employés and their families would be a great deal more comfortable, be sick not half so many days in the year, live twice as long (if you count children), and be stronger. Which sort of a town should it be? We chose the clean one.

The essential difference between the sanitary and unsanitary town is in drainage and sewerage; one is well drained and sewered; the other is not. But there are great conveniences that commonly go with drains and sewers, that cost not near so much if built when the town is laid out, such as pavements, sidewalks, waterworks, gas-works, electric-works, etc.

All these things are provided in cities; but how? One after another, separately, interfering with one another, at heavy cost; the work is never done, and the cost is never done with, in cities. Besides, the work is so done, in cities, that "modern improvements" do a great deal of harm as well as good, and entail no end of expense for repairs. The expense is not thought of, because it is paid by the city; but where does the city's money come from? These things are all done at once and beforehand at Vandergrift; well done, too. They will serve their full use; and the cost of maintaining the various systems will be as light as possible.

But neither map nor picture can show how good a site we have. When you look at the place as it is, you see the slope to the north and east to the river, the Works on the flat below, the river, and the tumble of wooded precipitous hills on the other side. It seems formed by nature for just this use. The Works are under the foot of the slope, and, but for the chimneys, scarcely in sight from the town. The Works are along the railroad, sufficiently high to be safe from floods; and the town on the slope above, and plateau still farther above and back. We have the advantage of natural drainage, though we by no means rely on that; and the view from all parts of the town takes in the hills and ravines across the river.

The town-plan is by Mr. Frederick Law Olmsted, the architect of the general plan of the World's Fair at Chicago.

Our water comes from artesian wells in the hills: a source that assures an abundance of good clean water.

The preliminary work is well advanced. The grading was mostly done in the winter. The streets and sidewalks and parks will be mostly done this summer. The underground work is going on. By fall, a good many people will be in their houses and have full use of the streets, sidewalks, sewers, drains, water, natural gas, electric-light, etc. The streets will be paved with vitrified brick, the sidewalks curbed and paved; the sewers are under the streets; but the other pipes are under the alleys, not in the streets, to avoid disturbing pavements.

All this public work we have done ourselves. It is better done, and cheaper, than such work is ever done, or can be done, by the people. We have done it just as we build our own Works and manage our business.

Besides these public works, there are private beginnings. A planing-mill will be ready by the middle of summer. Six three-story brick buildings October 1st: the ground floors to rent for stores, the upper floors for dwellings. Churches are forming themselves — we give the ground for a church and pay half the cost of the church. A Building Society, started some months ago, is going on well; institutions of several sorts are taking shape. By the end of the summer, the town will have better provision for most of the wants of its people than any existing town of ten-thousand inhabitants. This is written in June when events are ripening fast; there will be more done in the next six months than we know beforehand. Almost the only advantage of older towns is the size of their trees; of course, ours are mere stubs — we have a fine woods near by, however.

We have started the town to enable our employés to live in comfort and health, and to save their money. It is a place where a man can set up and maintain as good a home as he is fit for.

In the beginning, the town will consist of our employés and the tradesmen to serve them in various ways; but we are already receiving a stream of inquiries from strangers who happen to hear of the new provisions for living at Vandergrift. Evidently there is general interest in it.

Other Works will come, if we choose to sell them the land — we have two or three times as much as we want for ourselves, adapted to Works and to nothing else, as good as that we have built our own Works

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Cathedral of St. John the Divine.

New York, N. Y.

WE offer the illustrations of the competitive designs for the great Protestant Episcopal Cathedral, now building on Bloomingdale Heights, New York, submitted by the following Architects:

CARRÈRE & HASTINGS	New York, N. Y.	CRAM & WENTWORTH	Boston, Mass.
EDWARD P. CASEY	" " "	JOHN LYMAN FAXON	" "
HENRY M. CONGDON	" " "	PEABODY & STEARNS	" "
ROBERT W. GIBSON	" " "		
B. G. GOODHUE	" " "	STEPHEN C. EARLE	Worcester, Mass.
HEINS & LAFARGE	" " "		
HUSS & BUCK	" " "	T. P. CHANDLER, Jr.	Philadelphia, Pa.
W. A. POTTER & R. H. ROBERTSON	" " "	COPE & STEWARDSON	" "
RENWICK, ASPINWALL & RUSSELL	" " "		
FREDERICK C. WITHERS	" " "	W. S. FRAZER	Pittsburgh, Pa.
PARFITT BROTHERS	Brooklyn, N. Y.	L. S. BUFFINGTON	Minneapolis, Minn.
W. HALSEY WOOD	Newark, N. J.	VAN BRUNT & HOWE	Kansas City, Mo.

In all, fifty-seven plates [loose], 14 x 20 inches, printed on plate-paper.

PRICE, $2.50 PER SET.

AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, 211 TREMONT STREET, BOSTON, MASS., U.S.A.

on — flat and along the railroad. The town ready-made will attract them. We should not have gone out of our way to do such a job as this, and tie up money in lots and streets, and pavements and pipes, if we could have found a suitable town. And here it is ready-made, and as good for somebody else as it is for us; it is better for others; they haven't got to start it — no one likes to begin a settlement.

Apart from works and mills altogether, the town will attract inhabitants. Nowhere else are such comfort and safety and ease at any such cost. We mistake the shrewdness and thrift of people in general, if there is not a continuous active demand for property here at once.

APOLLO IRON & STEEL CO.,
Pittsburgh, Pa.

THE MITCHELL WATER-HEATER.

Within the past few years the system of heating residences and greenhouses by the circulation of hot water has become so popular that manufacturers have given much attention to the invention and bringing out of new designs in water-heaters. The result is that many water-heaters of faulty construction have been placed in the market and backed up by firms with large capital, who, by extensive advertising, have made many sales. That such faulty construction has been adopted by so many manufacturers of water-heaters, is not due to a lack of knowledge as to what was required in a heater, but largely for commercial reasons. Makers of hot-air furnaces felt the need of a water-heater to retain their trade with the heating public, and have adopted a construction of water-heaters which could be made with such foundry facilities as they already possessed, trusting to their selling facilities to place their goods upon the market.

In designing the Mitchell Water-heater we did not consult the resources of our foundry, or the class or kind of work in water-heating turned out by foundries in general, but designed a heater based upon the truest and best principles, trusting to our ability to bring the foundry up to a point where we could successfully produce the work as designed.

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AMERICAN BOILER COMPANY,
New York, N. Y.

INFRINGEMENT WARNING.

New York, N. Y., July 25, 1896.

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The Babcock & Wilcox Co.

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ALSEN'S PORTLAND CEMENT

is the strongest and most serviceable Cement made, and will permit the admixture of a larger amount of sand or gravel with less loss of strength than any other brand; it is therefore the most economical. It is the finest ground cement made, and has the largest bulk to the barrel.

The following test, made in actual work, by Col. D. C. HOUSTON, Corps of Engineers, U. S. A., at the sea wall around Governor's Island, New York Harbor, has never been equalled by any other cement. It is as follows: Tensile strength per square inch, one day, 384 pounds; seven days, 600 pounds; thirty days, 818 pounds.

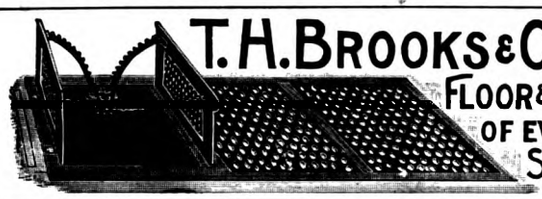
For Sidewalks it gives the best color, and the most endurable wearing surface. Most of the prominent Railroad Bridges and the large Office Buildings of the country stand upon a foundation of concrete made of ALSEN'S CEMENT.

Alsen's Portland Cement Works, New York Office, 143 Liberty Street.

ENCAUSTIC TILE, MARBLE MOSAIC, **FLOORS** LATEST DESIGNS

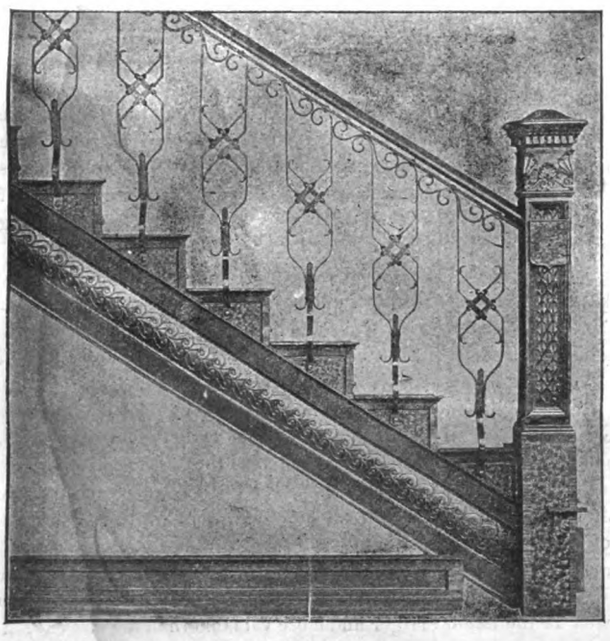
Furnished and Laid anywhere in the United States or Canada. Guarantee Bond if Required. Designs and Estimates on Application.

JNO. M. LILLY, 59 EAST OHIO STREET, INDIANAPOLIS, IND.



T. H. BROOKS & CO. CLEVELAND, O.

FLOOR & SIDEWALK LIGHTS. OF EVERY DESCRIPTION. SEND FOR CATALOGUE.



STAIRWAY IN CAST AND WROUGHT IRON, ALDINE HOTEL, PHILADELPHIA, PA. ADDISON HUTTON, ESQ., *Architect.*

The **SNEAD & Co. IRON WORKS,**

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MAKERS OF

Structural and Ornamental **IRONWORK**

FOR

ARCHITECTURAL PURPOSES.

Finest Castings in Iron, Brass, Bronze and Aluminum.

Hand Forged and Hammered Wrought-Iron Work.

Electro-Plating and Bower-Barffing.

Structural Work in Cast-Iron and Steel.

CRANE ELEVATOR COMPANY.

The Crane Elevator Company wishes to call particular attention to its improved vertical elevator machines of the

Plunger Type, geared only two to one, even for the highest buildings.

These machines occupy no more space than the counterweights of ordinary elevator machines.

For economy of operation they are unparalleled by the elevators of any other make or motive power.

In ease and certainty of control, and smoothness of operation, they are superior even to the best hydraulic elevators heretofore made.

GENERAL OFFICES AND WORKS:

219 South Jefferson Street, CHICAGO.

REMOVAL NOTICE.

NEWARK, N. J., July 1, 1896.

ON account of rapidly increasing business, we have been compelled to seek larger quarters. We have therefore leased for a term of years, the large and commodious five-story building on Front Street, foot of Centre Street, this city (directly opposite the Centre St. Station of the Penn. R. R. Co.), where we shall be located on and after July 15, 1896.

With increased facilities and the prompt attention which we shall be able to give to all orders, we hope for the continuance of the patronage of our old customers, and to make many new ones. Respectfully,

THE STORM MFG. CO.,
NEWARK, N. J.

NOTES.

MR. OSCAR LOWINSON, 39 Cortlandt Street, N. Y., is at present engaged in making a series of tests on the transverse crushing strength of large timbers taken from buildings undergoing alterations, with the object of determining unit values, having especial reference to the strength of existing structures.

MY new catalogue of Architectural and Art Industrial Works is just issued, and I will mail you the same free upon application. At your request, I will send you any work you may wish to examine "on approval," and offer you the most liberal terms of payment. Please communicate with me, and I will gladly give you all the further information.

BRUNO HESSLING,
64 EAST 12TH STREET, NEW YORK, N. Y.

THE Flexible Door and Shutter Co., of Worcester Mass., is about to remove its scene of operations to a large and well equipped factory at Bloomsburg, Pa. When that has been accomplished their goods will be marketed from their New York office, 74 Fifth Avenue.

IN issuing that one of their series of catalogues which deals with metal-fencing, the Ludlow-Saylor Wire Co., of St. Louis, take occasion to say:

"Most people have an idea that freight rates are very high, but when the truth is known, they find that they have been greatly mistaken. Freight is an extremely small item and we hope that our intending buyers will write us and ascertain the freight rate to their particular place, before they conclude (from misinformation) that the freight on the material would be too much. Owing to the fact that we are located in such a railroad centre as St. Louis, we enjoy the use of much lower rates than any of our competitors. This is an advantage to the purchaser."

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THE AMERICAN ARCHITECT AND BUILDING NEWS

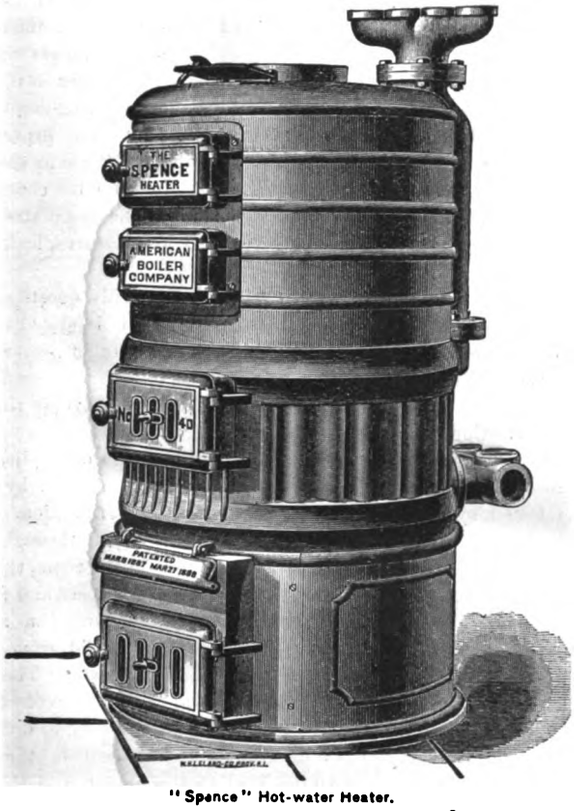
ADVERTISERS' TRADE SUPPLEMENT.

No. 171. SATURDAY, SEPTEMBER 5, 1896. VOLUME LIII. No. 1080.

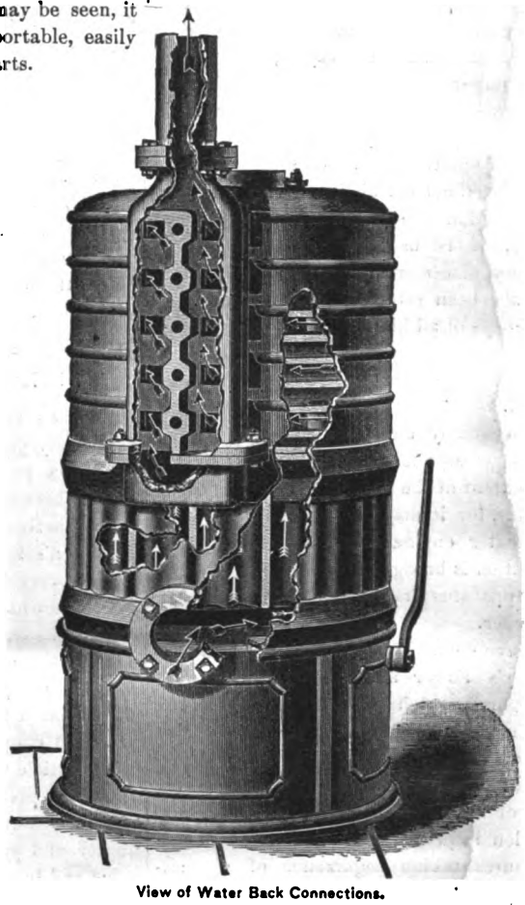
THE SPENCE HOT-WATER HEATER.

THE "Spence" Heater has been brought very prominently before the trade and general public and has, on account of the universal satisfaction which it has given, established for itself a very commendable reputation. This heater represents the development of over thirty years of study and labor on the question as to how economy, durability and efficiency could best be combined with simplicity and beauty of design.

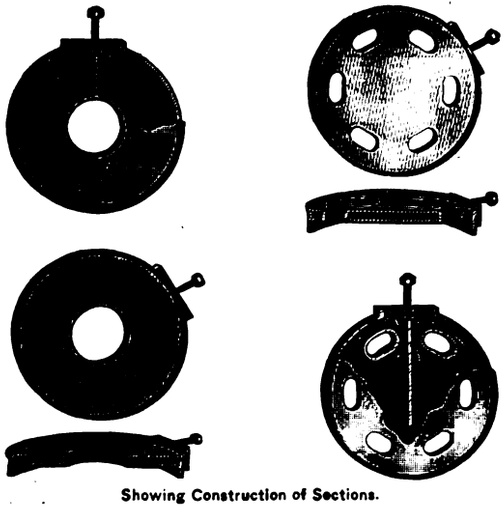
A general idea of the construction of the "Spence" may be obtained by referring to the accompanying cuts. As may be seen, it is sectional in construction, portable, easily set up, and composed of few parts.



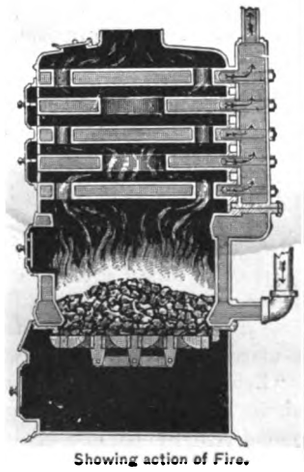
"Spence" Hot-water Heater.



View of Water Back Connections.



Showing Construction of Sections.



Showing action of Fire.

The sections are of two distinct patterns, one having a single smoke-flue in the centre and the other having six smoke-flues distributed in the form of a hexagon. The area of these flues in each section is equal to the area of the opening for smoke pipe, hence the surface of each is in every part equally affected by the products of combustion in their passage through, and none go to waste into the chimney. Through the clean-out doors all parts of these sections requiring to be cleaned are easily accessible.

The firepot is of a form of construction which, after exhaustive experiments, has been found to be the best adapted to hot-water heating; no fire-brick, or other non-conductor being used, the heating-surface is most efficient. The feed door is fitted with a gas damper and is sufficiently large, even in the smallest sizes, to permit the admission of an ordinary coal-shovel. The grate, which combines the rocking and dumping principles, is so constructed as to allow for liberal air spaces, thus assuring perfect and complete combustion of the fuel. It works with very little effort and acts alike upon all portions of the fire, removing ashes as effectually near the edges of the firepot as in the centre.

From the cut of the water-post section it may be seen that the only joints are those

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which connect each section with the water-post at the back; also that each section is an independent heater, the water passing through only one section and not having to traverse the successive sections above. This feature of construction permits the waterways to any section to be closed by a blank gasket and the balance of the system to be run without it. This is of incalculable value in case of accident to any section, as the remaining sections can be used until a new one is obtained to replace it, and this replacing may be done without disturbing the piping, as it is only necessary to remove the bolts which fasten the sections to the water-post.

"Spence" catalogue forwarded upon request.

AMERICAN BOILER COMPANY.

Main Offices: 94 Centre Street, New York; 84 Lake Street, Chicago. Branches in Boston, Philadelphia, Pittsburgh, Indianapolis, St. Louis, Kansas City, Syracuse, Denver, etc.

GROWTH OF ELECTRIC POWER.

THE growth in the use of electricity is none the less rapid because carried on quietly. To gauge the progress attention should not so much be directed to the fields of electric lighting and electric railways, as to that of electric power, a field which is now steadily repaying the arduous culture bestowed upon it during the past few years. Not a day now passes without the record of some extensive project for the transmission of power, or of the completion of some installation in which the current is used to supersede steam, or in new places where steam would otherwise have been selected. Mills, mines, factories, shops of all kinds all over the country are steadily coming to the use of electric power, and the first failure has yet to be recorded.

The economy and efficiency of electric power is perhaps most forcibly demonstrated by the extent of the orders placed for power apparatus, for it may be confidently asserted that greater engineering talent and closer examination is brought to bear upon electric-power apparatus than upon apparatus of any other order.

We have secured from the General Electric Company's Power and Mining Department some figures which illustrate not only the growth in the use of electric power, but also its economy and efficiency. These figures are represented in the unfluctuating horse-power instead of in dollars, which on account of the fluctuation in prices, offers a standard gauge. The figures taking cognizance of electric-power apparatus only.

	1892	1893	1894	1895
Horse-power...	13,719	18,762	42,379	46,727

In 1896 the missionary work of the past four years began to come to rapid fruition. From January 1st to July 1st, the total horse-power of the apparatus amounted to over 48,000 horse-power. During the same period in 1895 the aggregate orders amounted to 25,737 horse-power. From August 1st to August 18th, the total amount of power apparatus ordered during 1896 was increased to the respectable figure of 62,164 horse-power.

Such a showing in face of the universal dulness in business everywhere is remarkable, and perhaps emphasizes the fact that during the hard times the truest economy is the use of apparatus which costs least to operate. It may be said that in every manufacturing establishment using electricity as its motive power, the output has not only been increased but its quality improved.

RE BERLIN INDUSTRIAL EXHIBITION.

AMONG the large German firms in the building line showing important progress in building and exhibiting objects of special interest to architects, contractors and manufacturers of building-material, there is the Patent Plaster Board factory of A. & O. Mack, Ludwigsburg and Berlin.

With a complete house constructed from plaster material and called "The Workman's Dwelling of the Twentieth Century," Messrs. Mack give a speaking illustration of the manifold and most useful applications of their well-known and much-appreciated "Mack's Plaster Boards" and of a newly invented manufacture called "Mackolith"; the latter is an absolutely weatherproof, fireproof and very well isolating building stuff especially for outside walls, cellars, bathrooms, kitchens, etc.

The use of Mackolith combined with that of Mack's Plaster Boards enables the erection of cottages for workmen and subalterns, country seats, factories of every kind, military-barracks and hospital-barracks, etc., within 6 to 8 weeks at any season in an absolutely dry condition and ready for use.

Another capital point of Mack's Plaster system is its enabling much cheaper construction than the usual ones and which are illustrated by plans in a small catalogue edited by A. & O. Mack for the use of everybody having an interest for progress in building.

As we hear, Messrs. Mack possess American Patents both for Plaster Boards and Mackolith and are willing to deal with American firms wanting to acquire the said Patent-Rights.

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DIXON'S Graphitoleo is a preparation of a very finely pulverized and very choice graphite and a pure petroleum warranted not to gum or become rancid.

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GURNEY HEATER MANUFACTURING COMPANY.

THE Gurney Heater Company, of Boston, have just issued an attractive little catalogue bound in paper covers bearing in gold and colors illuminated designs by L. S. Ipsen. As there is little danger in constant repetition of good advice or sound information, we extract from its pages the following statements apropos of hot-water heating:—

"Erroneous ideas exist in many persons' minds, through want of knowledge of the system of hot-water heating, in reference to the dangers of freezing, leaking, corroding and rusting of pipes, pressure, etc. To answer these points briefly, we would say that there is no danger with this system from any of the above sources, as the apparatus is generally used in a building where the temperature is always above 32 degrees Fahr., consequently there is no danger of freezing; in other words, your house would have to cool from, say, 70 to 32 degrees Fahr. (or considerably below) before apparatus would freeze. When taking into consideration that hot-water pipes retain their temperature from six to eight hours after the fire is extinguished, the danger from freezing is not likely to occur; in fact, speaking from an experience of many years, we have never had a case brought to our notice. Thus, it will be seen, it is free from this danger. If, however, there are certain portions of a building that do not require continual heating, the pipes can be so arranged, by putting in valves and draw-off cocks, that the water may be emptied from the radiators at any time. This, perhaps, applies more particularly to public buildings, apartment-houses, etc., than private residences. In the latter the apparatus should be constructed as simply as possible, and the entire house evenly heated and the temperature regulated by the use of a hot-water thermometer placed on heater.

"*Leaking of Pipes.*— This is simply *impossible*, as, the apparatus being open to the atmosphere through the expansion-tank, there is absolutely no pressure whatever upon the system, only the weight of water in the pipes, which in any ordinary dwelling-house would rarely exceed 10 to 12 pounds pressure per square inch; and when taking into consideration that the material used in the construction of the apparatus is of the same strength as used for highest steam pressures, leaky joints are impossible.

"*Rusting of Pipes.*— This question is frequently asked, but when it is stated that the heater and pipes are kept full of water during the summer months, oxidation cannot occur, as the air is excluded and prevents the pipes from rusting.

"*Water heating* is capable of application in the same way as steam; namely, by direct, direct-indirect, and indirect radiation. By the first the heat is conveyed through pipes directly to the radiator in the room, this being the cheapest both as to first cost and for fuel. Direct-indirect is by the use of a radiator having a column of air brought from outside the house through the radiator. The difference in cost between this and direct radiation is not great, but still there is a difference. Indirect radiation is placed in the cellar above the level of the heater, and the whole heat is derived by convection currents of air carried over and into the rooms to be heated. This method, while it is frequently used, is much more expensive as to first cost, and is especially expensive in the use of fuel. A very good method, and one that we prefer to the adoption of any of these, is to depend mainly upon *direct radiation* for heat, and upon indirect radiation for ventilation, our preference being to deliver the air for ventilation into the halls, from whence it finds its way into different rooms, drawn by the evacuation currents through the fireplace flues."

GURNEY HEATER MFG. CO.,
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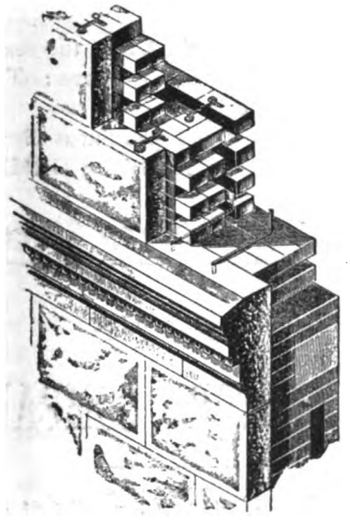
MR. GEORGE FRINK SPENCER has just returned from an extended trip abroad, combining business with pleasure. Mr. Spencer is manager for the well-known firm of I. P. Frink, 551 Pearl Street, New York, maker of Reflectors for lighting churches, halls, public buildings, art-galleries, etc.

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MORSE PATENT STEEL WALL-TIES.

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It is an undisputed fact that houses built with hollow walls, properly bonded, are warmer in winter and cooler in summer than houses built otherwise. The two or more inches of air space in the interior of the wall



act as a non-conductor of heat or cold, and the variations in the atmosphere are not felt to nearly so great a degree as when the walls are built solid.

A perfect bond for hollow walls is the Morse Steel Wall-Tie for various well-defined reasons, and the manufacturers solicit a rigid examination of its merits.

The Morse Ties are also largely used for pressed-brick bonding. As compared with the diagonal Flemish and other similar brick bonds, they represent an economical use of material, a great saving of labor. The connection formed between the facing and backing is rigid and secure.

The Morse system is well explained and illustrated in a new catalogue recently published by the manufacturers.

Among the many notable buildings at present using the ties is the new Union Passenger Station, Providence; Massachusetts Hospital for Epileptics, Palmer; State Normal School, Lowell, Mass.

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The following important buildings are being treated by Messrs. Caffall Brothers, 41 Union Square, New York, with their Improved Waterproofing and Preserving Processes: The Carnegie Music Hall, Fifty-sixth Street and Seventh Avenue, New York, by order of Mr. Henry J. Hardenberg, Architect; the large new Manhattan Hotel Building, Forty-second Street and Madison Avenue, New York; the New York Club Building, Thirty-fifth Street and Fifth Avenue, New York; Mr. Wm. S. Pyle's residence, 3 East Fifty-third Street, New York; Mr. H. C. Fisher's residence, 111 West Eighty-sixth Street, New York, and other buildings and monuments in New York, Brooklyn, etc.

Architects and owners of property are recognizing the value of this process for the protection of modern high buildings, now being so generally erected in large cities, not alone on account of its preservative properties against the destructive attacks of the weather, but also for the preservation of the delicate colors of the materials used, such as Indiana limestone, white brick and terra-cotta, etc.

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The assertion that the *American Architect* is a paper whose characteristics are *national* and not merely local is supported by the following table, which exhibits the manner in which several journals have treated domestic architecture. In this comparison the IMPERIAL edition of the *American Architect* is considered, since the additional plates of the INTERNATIONAL edition are, in the main, illustrations of foreign work.

PAPER.	Number of subjects contributed.	Number of contributing architects.	Towns in which contributors were established.	States in which contributors were established.
No. I. . . .	214	109	28	16
No. II. . .	137	78	21	15
No. III. . .	118	56	16	11
Am. Architect.	267	152	47	24

In the first column, "subjects," only actual domestic work is included (foreign work, imaginative designs and the work of sketch-clubs are excluded), and the figures there given indicate that this number of designs might have been prepared by the same number of architects practising in the same number of different towns. The remaining columns show how nearly this ideal distribution has been reached in each case.

Architects practising in the State of publication furnished.				
Subjects.	Per cent of total number of subjects.	Different architects contributing.	Per cent of total number contributing architects.	Towns.
161	.752	75	.688	7
46	.335	24	.307	2
70	.593	22	.392	1
73	.273	39	.256	3

From this table it appears that Massachusetts architects —.256 per cent of the total number of contributors— provided only .273 per cent of the total number of designs published, percentages which, in view of the fact that Massachusetts is one of the most populous States in the Union, prove that they have not been accorded an unreasonable amount of our limited space.

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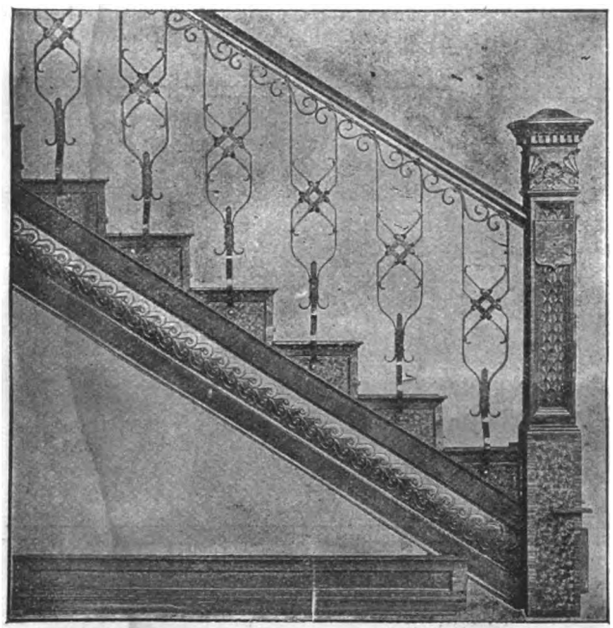


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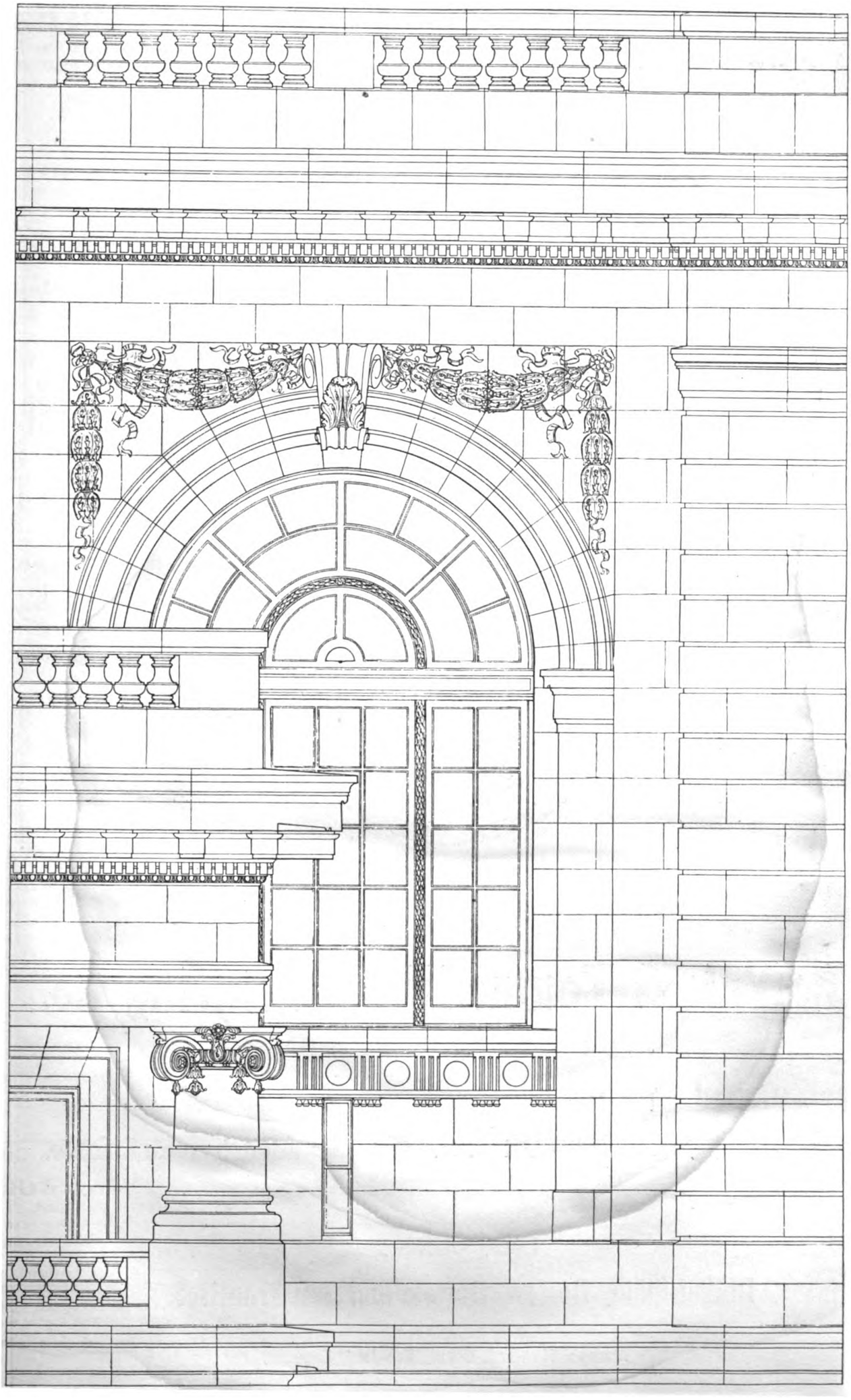
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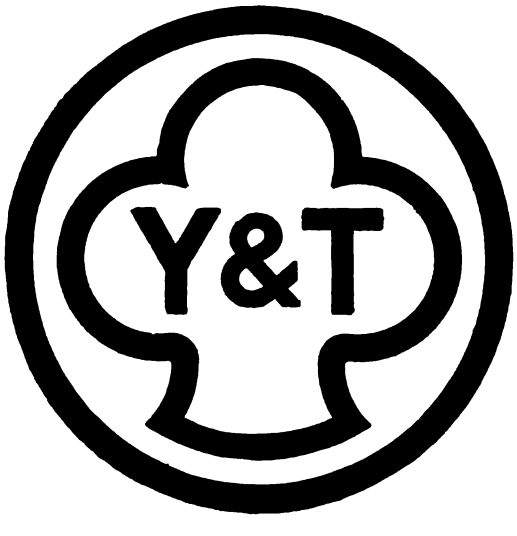
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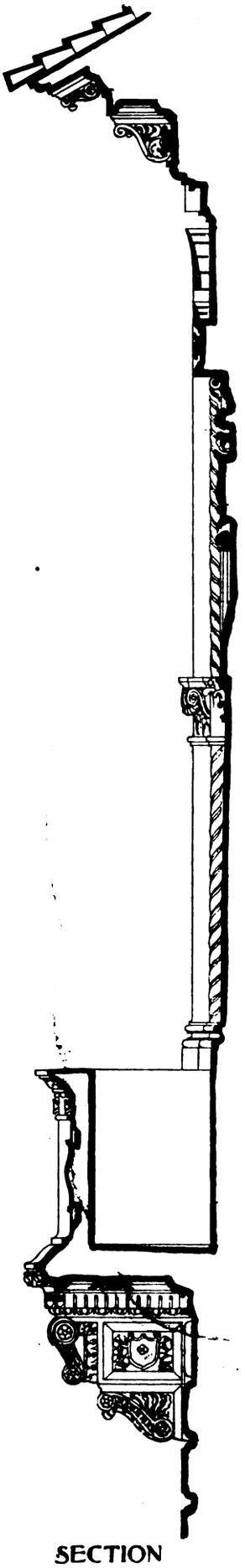
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Bangor Excelsior Slate Co., Easton, Pa.....
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.....(eow)
John Galt & Sons, New York.....
Slatington-Bangor Slate Syndicate, Slatington, Pa.....
Snow Guard.
Folsom Snow Guard Co., Boston.... ... (mon)
Specification Blank.
D. Mason & Co., Syracuse, N. Y.....
Spring Hinges
Van Wagoner & Williams Co., Cleveland, O...
Steam Pipe Covering.
H. W. Johns Mfg. Co., New York.....
Keasbey & Mattison Co., Ambler, Pa.....
Stone.
Bedford Quarries Co., Bedford, Ind.....
Potsdam Red Sandstone Co., Potsdam, N. Y...
Terra-Cotta.
Baltimore Terra-Cotta Co., Baltimore, Md.....
Indianapolis Terra-Cotta Co., Brightwood, Ind.
New York Architectural Terra-Cotta Co., New York.....
Perth Amboy Terra-Cotta Co., Perth Amboy, N. J.....
The Northwestern Terra-Cotta Co., Chicago, Ill.
Traps.
F. F. Cudell, Cleveland, O.....(eow)
W. Gordon Miller Co., Pittsburgh, Pa.....
Valves and Packing.
Jenkins Bros., New York.....
H. W. Johns Mfg. Co., New York.....
Varnish.
Murphy & Co., Newark, N. J.....
Vault Lights.
Dauchy & Co., Chicago, Ill.....
Ventilation.
Globe Ventilating Co., Troy, N. Y.....
Water Lifters.
Goulds Mfg. Co., Seneca Falls, N. Y.....
Waterproofing Masonry.
Caffall Bros., New York.....
Weather Vanes.
T. W. Jones, New York.....
Window-Glass.
Cohansey Glass Mfg. Co., Philadelphia, Pa....
Window Line.
Samson Cordage Works, Boston.....(eow
Wire Lathing, etc.
Clinton Wire Cloth Co., Clinton, Mass.....
New Jersey Wire Cloth Co., Trenton, N. J.....

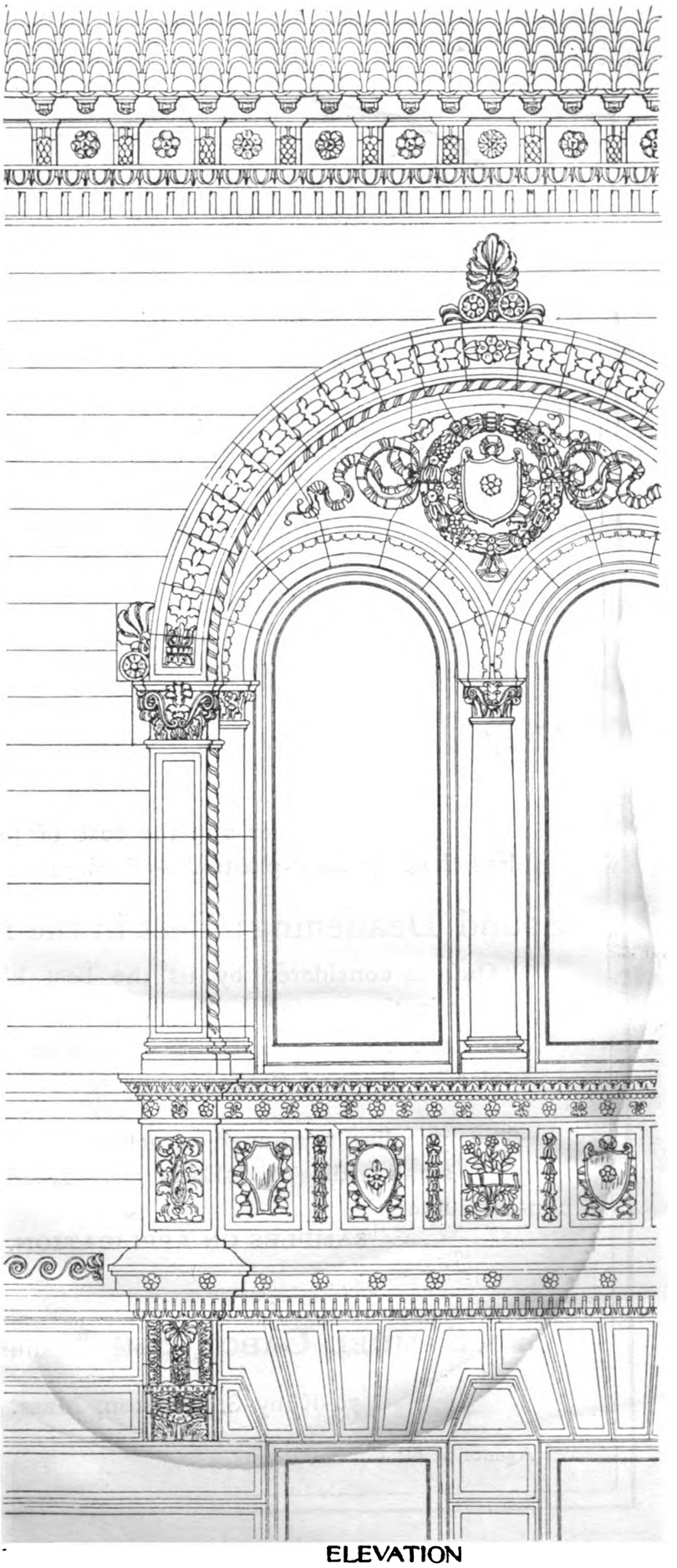
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CITY · HALL · WORCESTER
DETAL · OF · END · PAVILIONS

¾ INCH SCALE



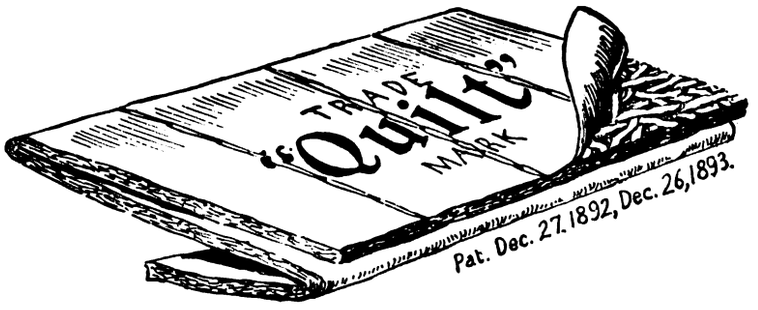
SECTION



ELEVATION

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The peculiar laminated structure of Quilt forms innumerable small cells of DEAD air. Dead air is the best non-conductor.

SAMPLES ON APPLICATION.

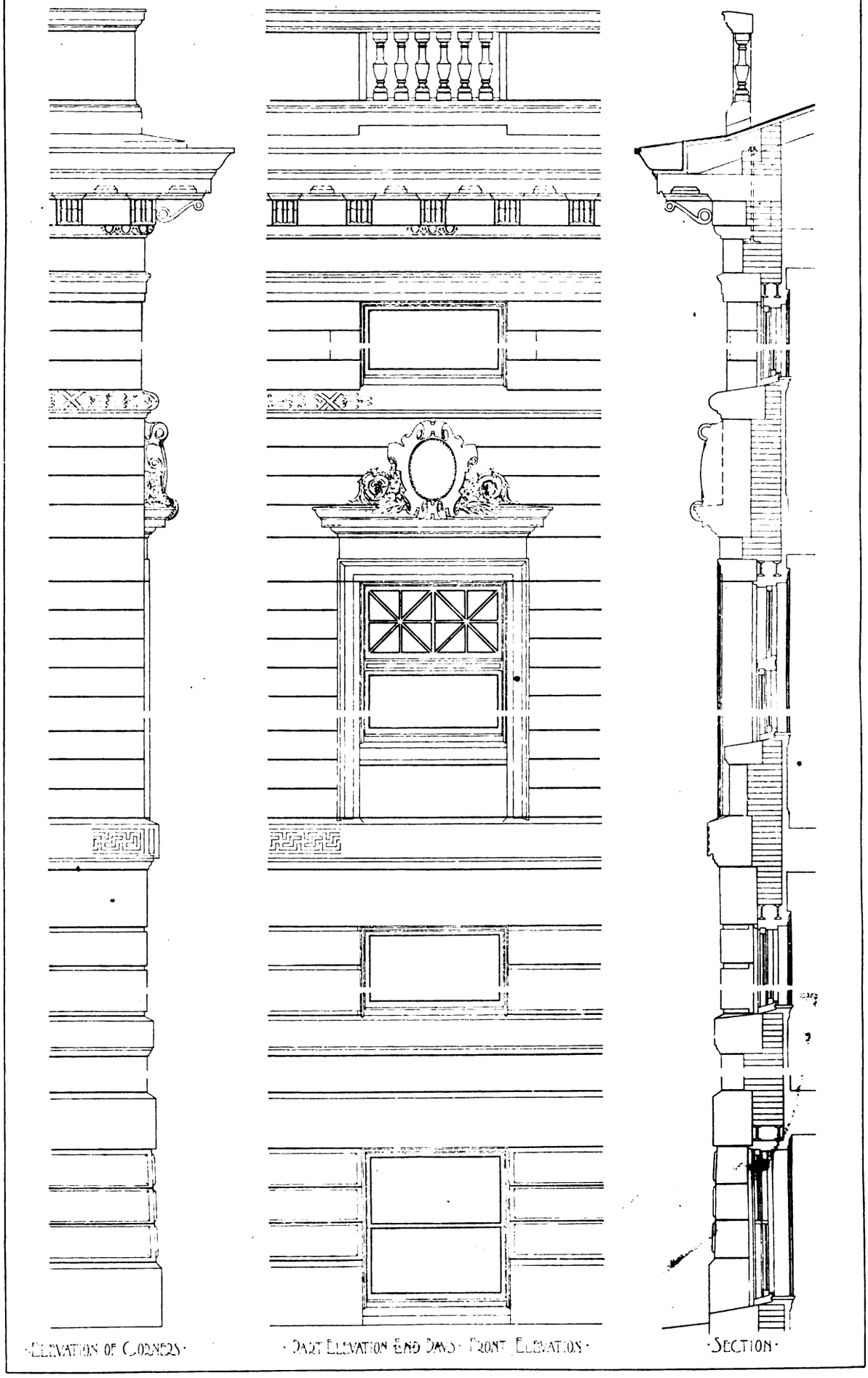
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DESIGN FOR NEW CITY HALL
WORCESTER, MASS.



HARTWELL, RICHARDSON & DRIVER, ARCHITECTS.

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✠ POTSDAM RED SANDSTONE ✠

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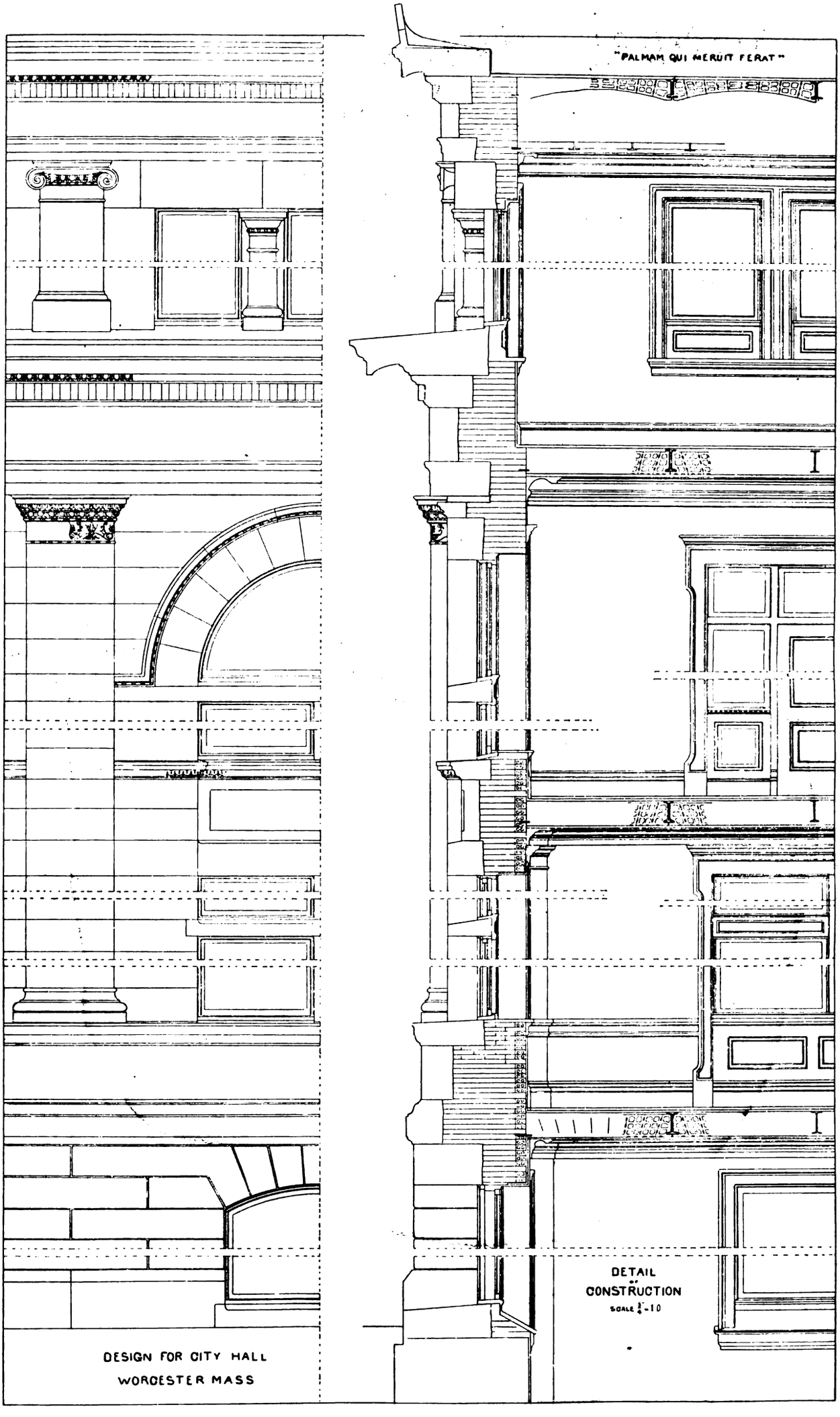
ARCHITECTS WHO HAVE ONCE USED POTSDAM STONE CONTINUE TO USE IT.

In order to introduce our material where it is not known we find it necessary to send it cut ready to set, in many instances. Our facilities for doing this kind of work are unsurpassed, and we can make very favorable prices. Plans sent us for estimate will be returned on the following day and we are always willing to pay express both ways.

The Potsdam Red Sandstone Co.

POTSDAM, N. Y.

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All sizes, 6" to 16".

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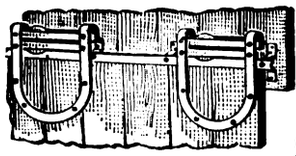
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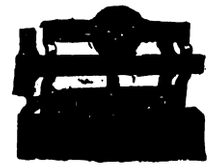
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Hanger is made of steel throughout, including wheel, except the filling which deadens the sound. Single steel track instead of double wood rail. Ask your Hardware Dealer and send for Circular.

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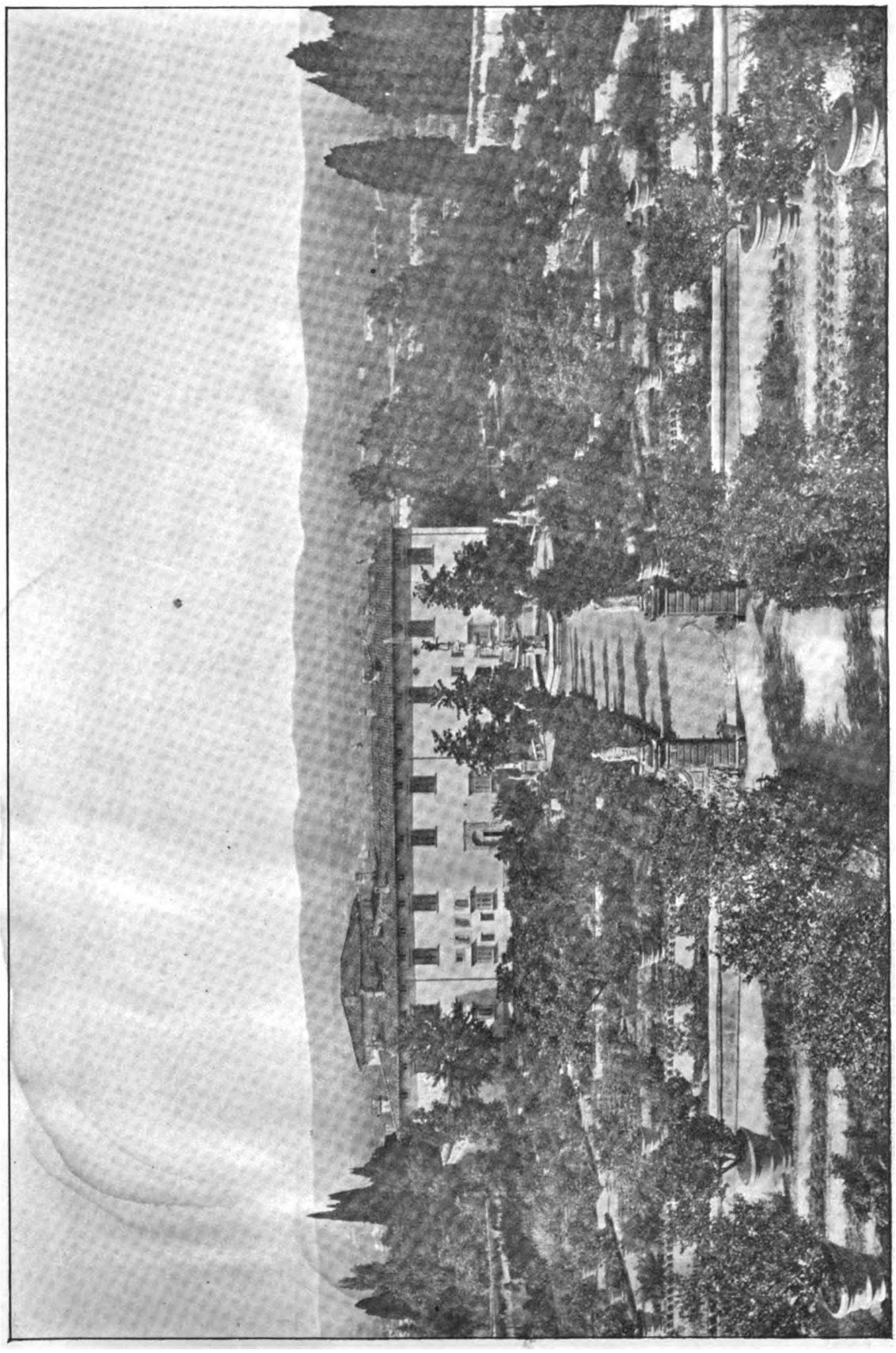
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GARDEN OF THE VILLA CASTELLO, NEAR FLORENCE.

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Ornamentation—Marengo.
School—Empire.
Size: 19 x 2½ inches.

The Yale Locks
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All Genuine Yale this Trefoil Y&T Hardware bears Trademark.

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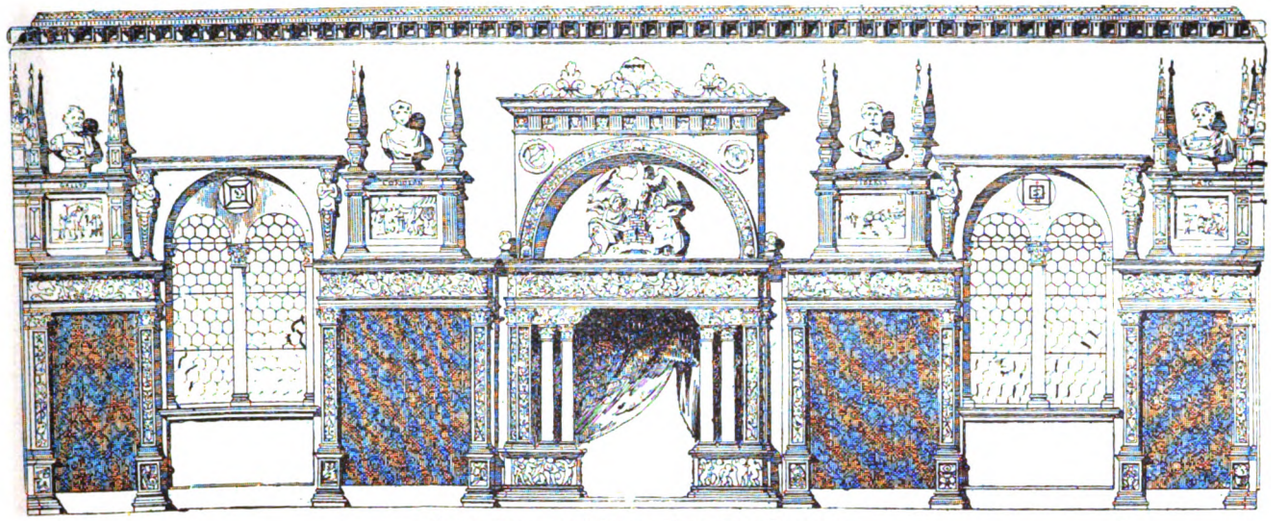
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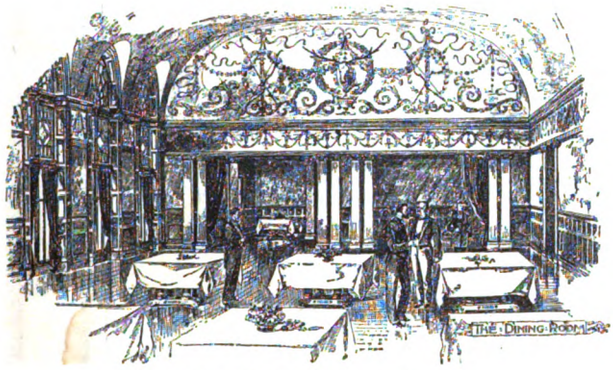
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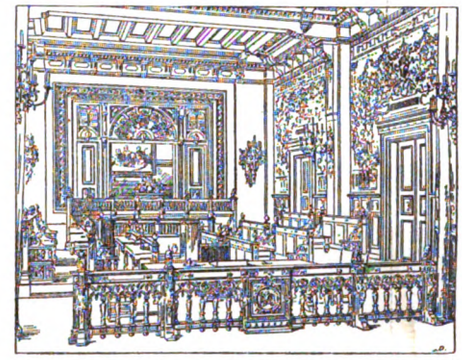
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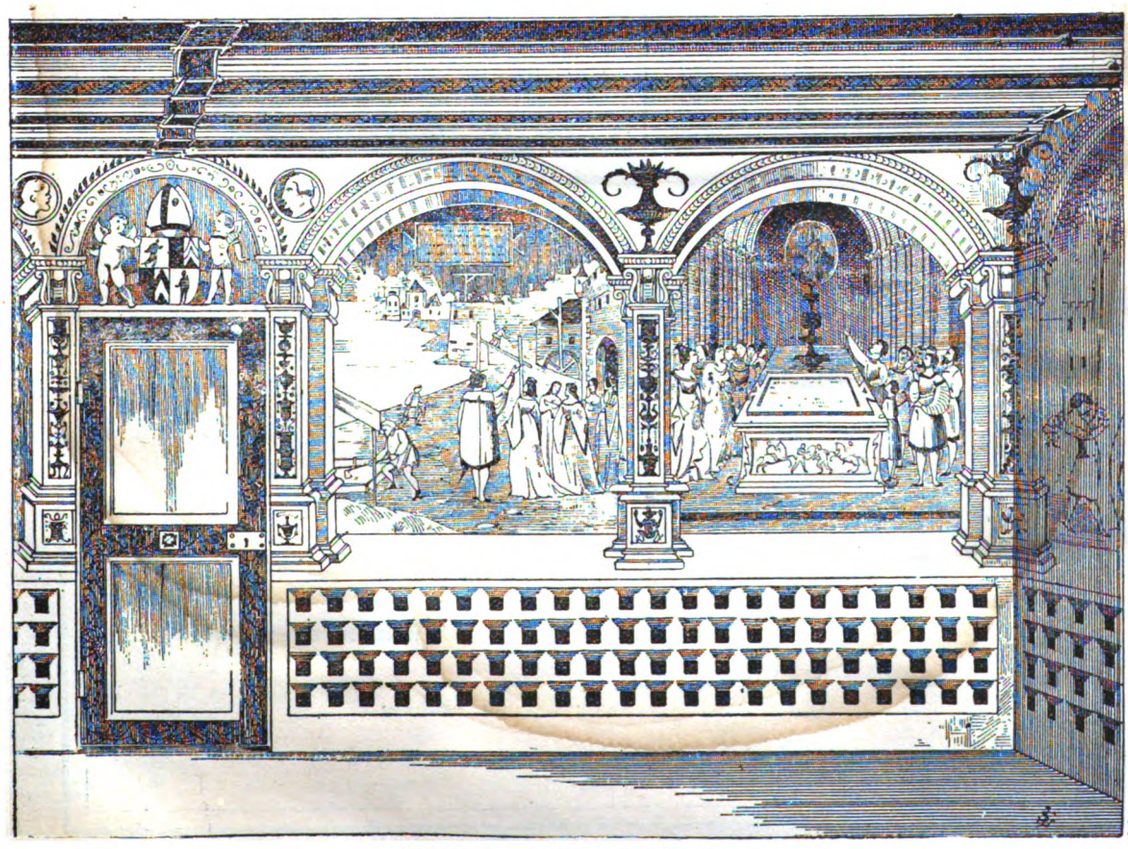
Hall in Rupprecht's House, Nuremberg, Germany.



Colonial Club-house, New York.

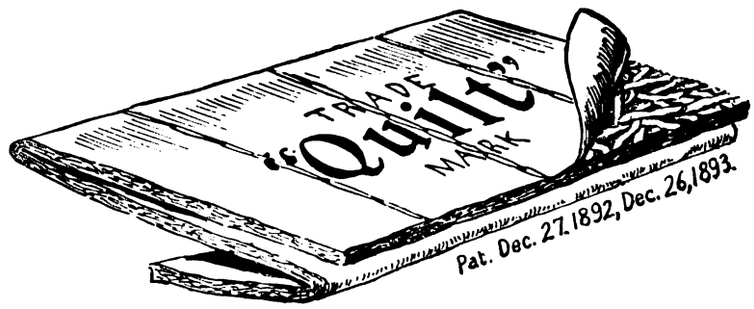


Communal Building, Schaarbeek, Belgium.



Hall in St. James's Monastery, Stein, Austria.

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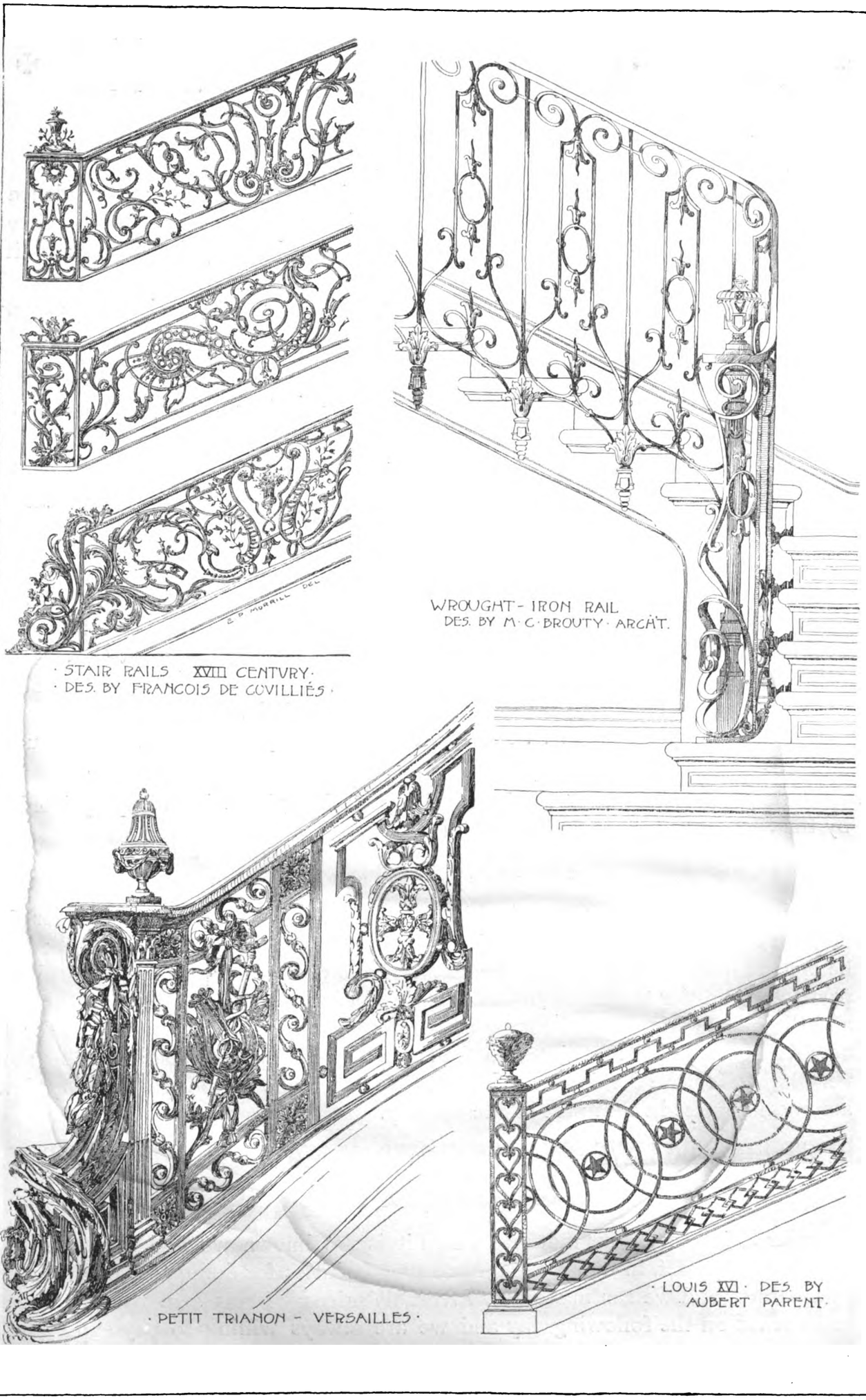
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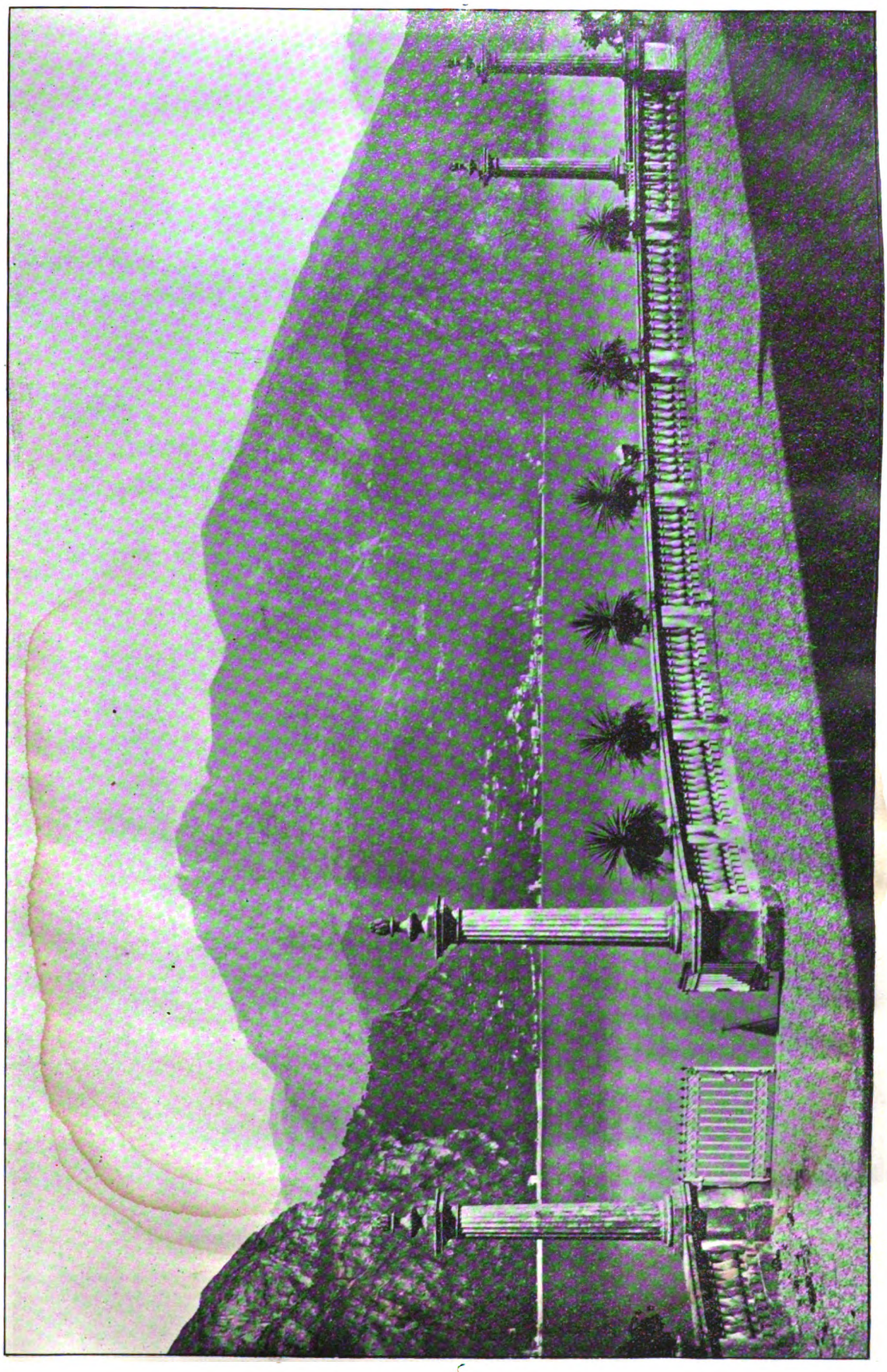
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The Potsdam Red Sandstone Co.

POTSDAM, N. Y.

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CAPITAL IN MONASTIC GALLERY OF TOULOUSE CATHEDRAL.

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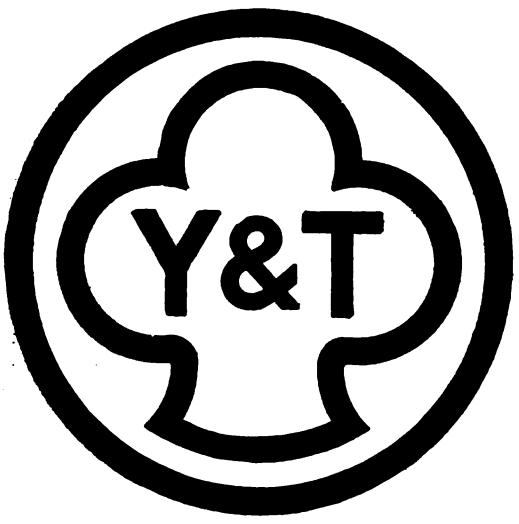
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Art Metal Work.

All Genuine Yale Trefoil



Hardware bears this Trademark.

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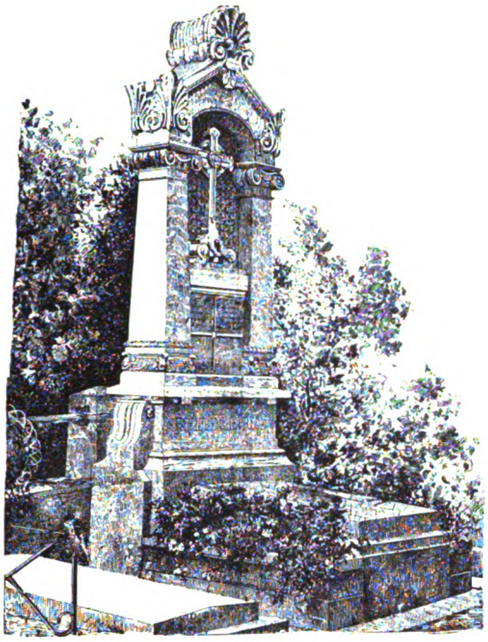
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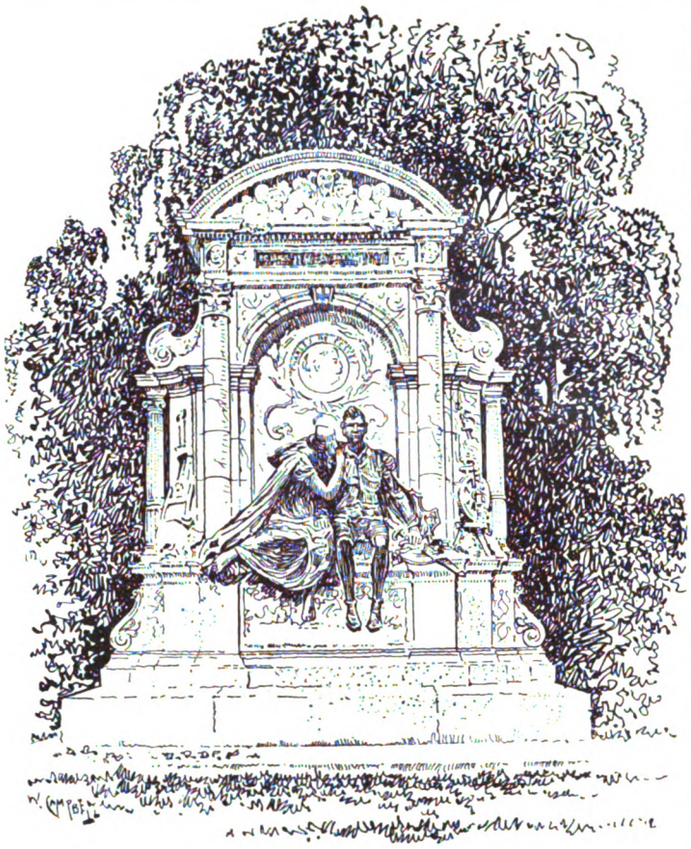
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Works: Stamford, Conn., Branford, Conn.

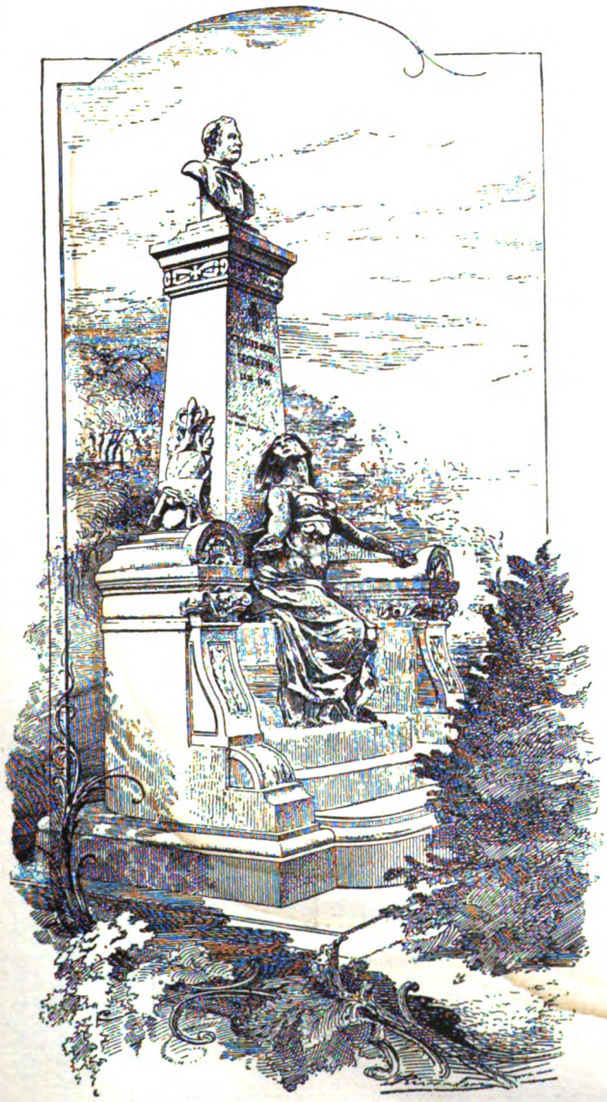
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Tomb at Boulogne-sur-Seine, France.



Monument to Charles de Coster, Brussels, Belgium.



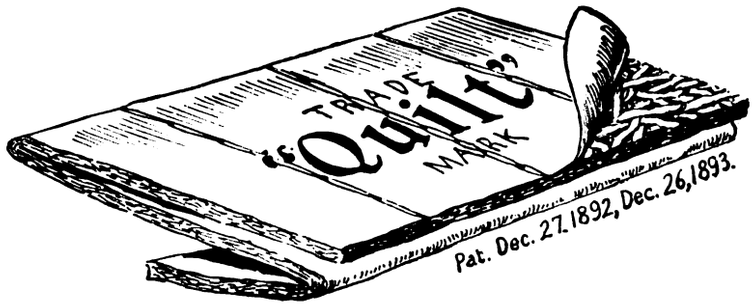
Monument to Charles Segoffin, Paris, France.



Avery Memorial Tablet, Columbia College, New York.

MEMORIALS.

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SAMPLES ON APPLICATION.

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Frieze, No. 27 Via Porta San Sebastiano, Rome, Italy.

Sgraffito Frieze, formerly at No. 5, Vicolo Matricciani, Rome, Italy.

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POTSDAM RED SANDSTONE.

✠ ✠ ✠ ✠ ✠ ✠ ✠

Dr. James Hall, *The eminent State Geologist of New York, writing us under date of 6th inst. says:*

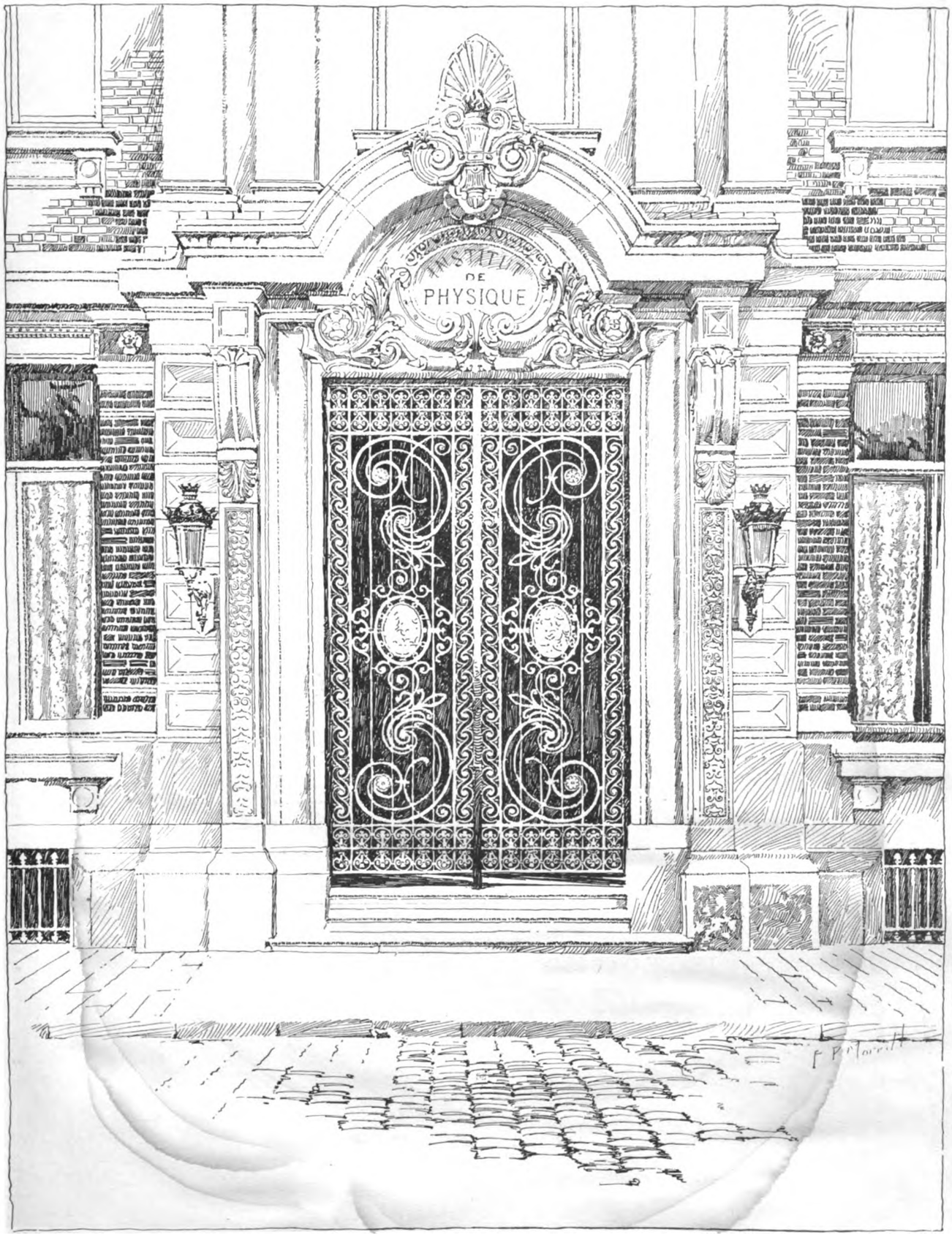
"So much has already been said in regard to the excellent quality of the Potsdam Sandstone that it is scarcely necessary for me to add any expression in its favor, beyond those you have already received. I have known the Potsdam Sandstone in its original locality since about the year 1837, and I have a very high appreciation of its character as a building-stone."

✠ ✠ ✠ ✠ ✠ ✠ ✠

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Entrance to the Institut de Physique, Lille, France.

M. C. Batteur, Architect.

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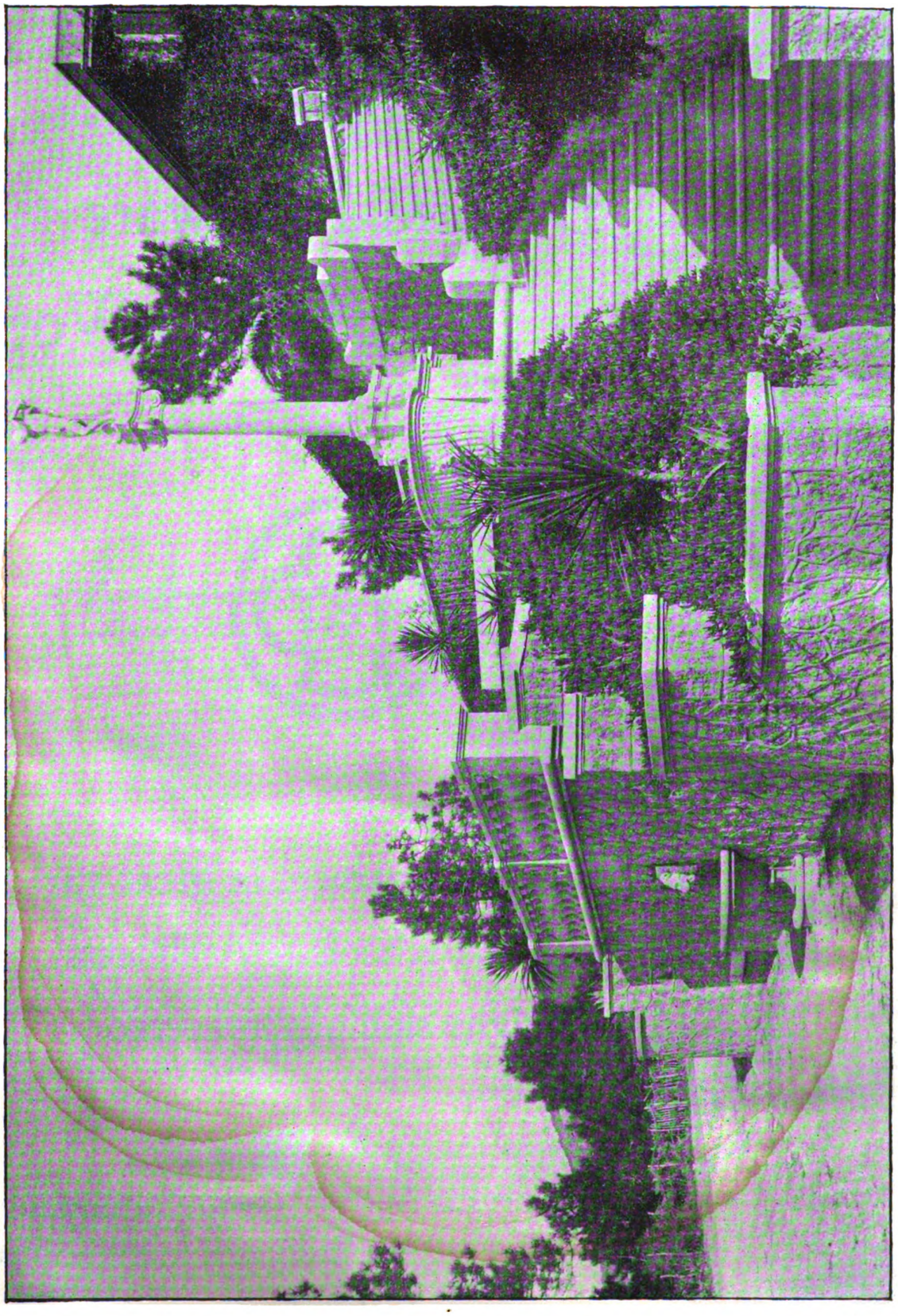
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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXIII.



FOUNTAIN OF ST. GEORGE, CANNES, FRANCE.

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The Yale & Towne Mfg. Co.



Ornamentation—Marengo.
School—Empire.
Size: 19 x 2½ inches.

The Yale Locks
Builders' Hardware
Art Metal Work

All Genuine Yale this Trefoil Hardware bears Trademark.

Y&T

Hardware of Ornament in great variety and in all schools. Architects' Designs skillfully rendered.

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WESTERN OFFICE:
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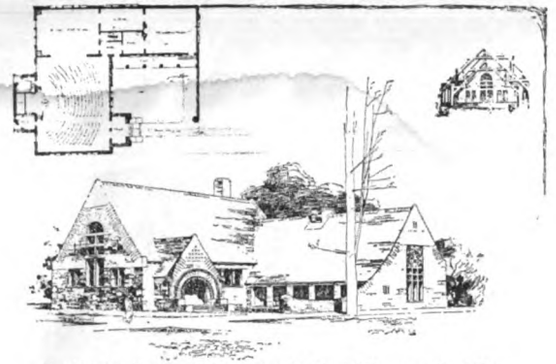
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WORKS: Stamford, Conn., Branford, Conn.

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Chapel, St. John's Military Academy, Delafield, Wis.



Design for Presbyterian Church, East Minneapolis, Minn.



Suburban Chapel.



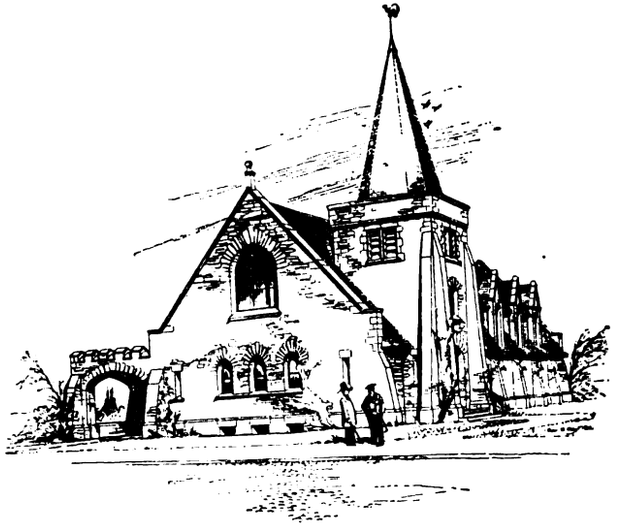
First Congregational Church, Short Hills, N. J.



Fourth Baptist Church, Paterson, N. J.



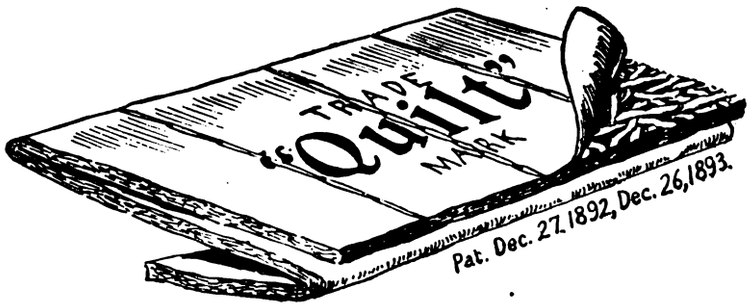
Mission Chapel, Minneapolis, Minn.



Sketch for Country Church.

SUBURBAN CHURCHES.

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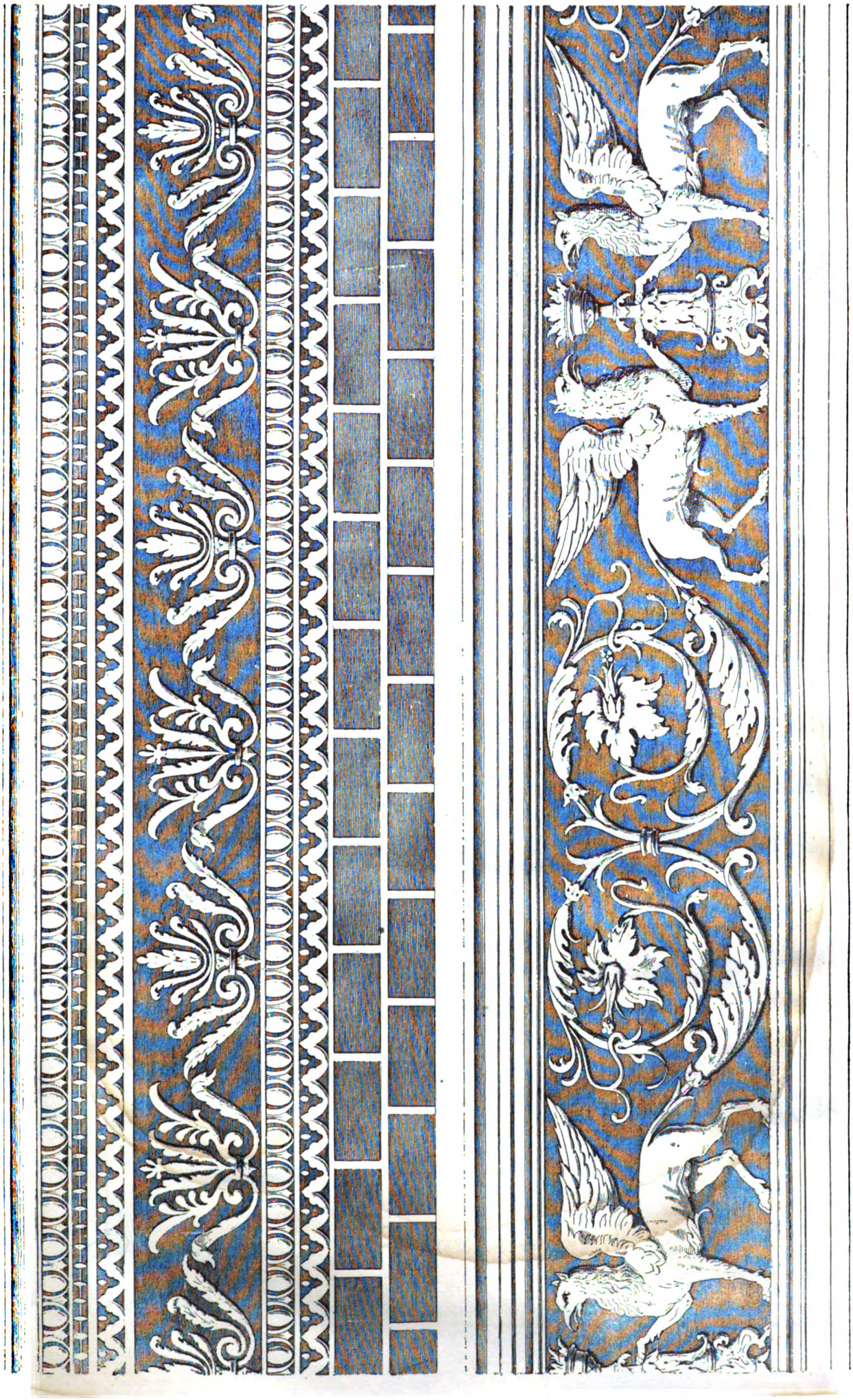
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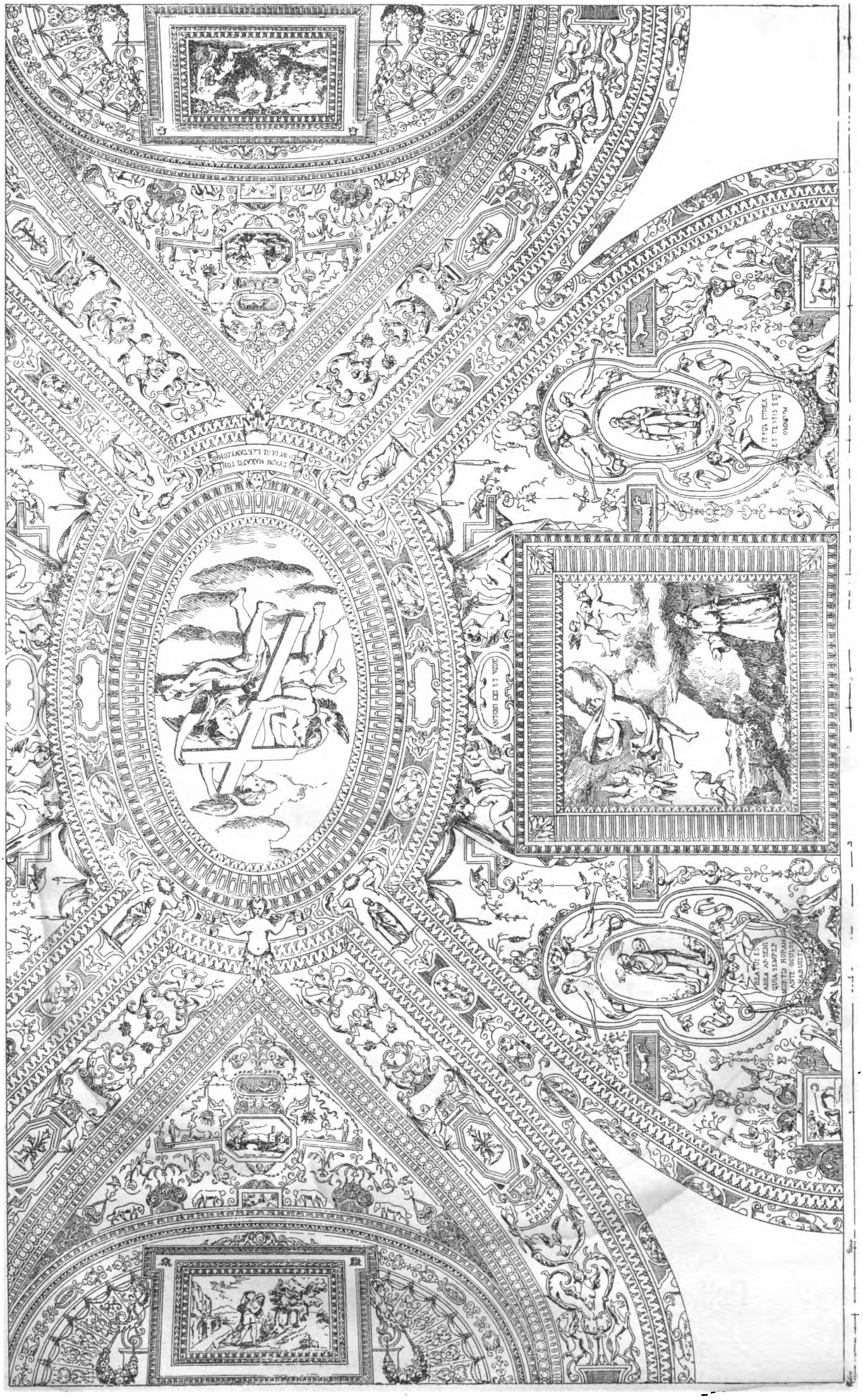
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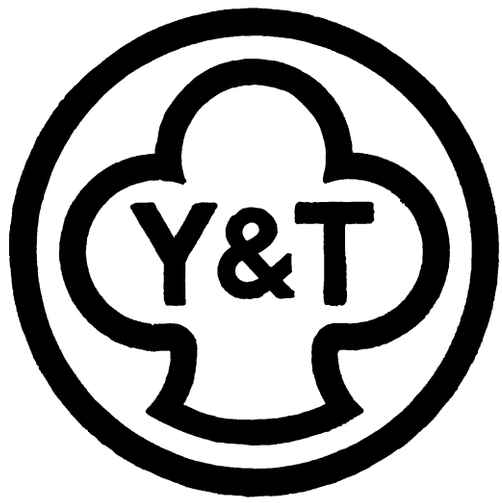
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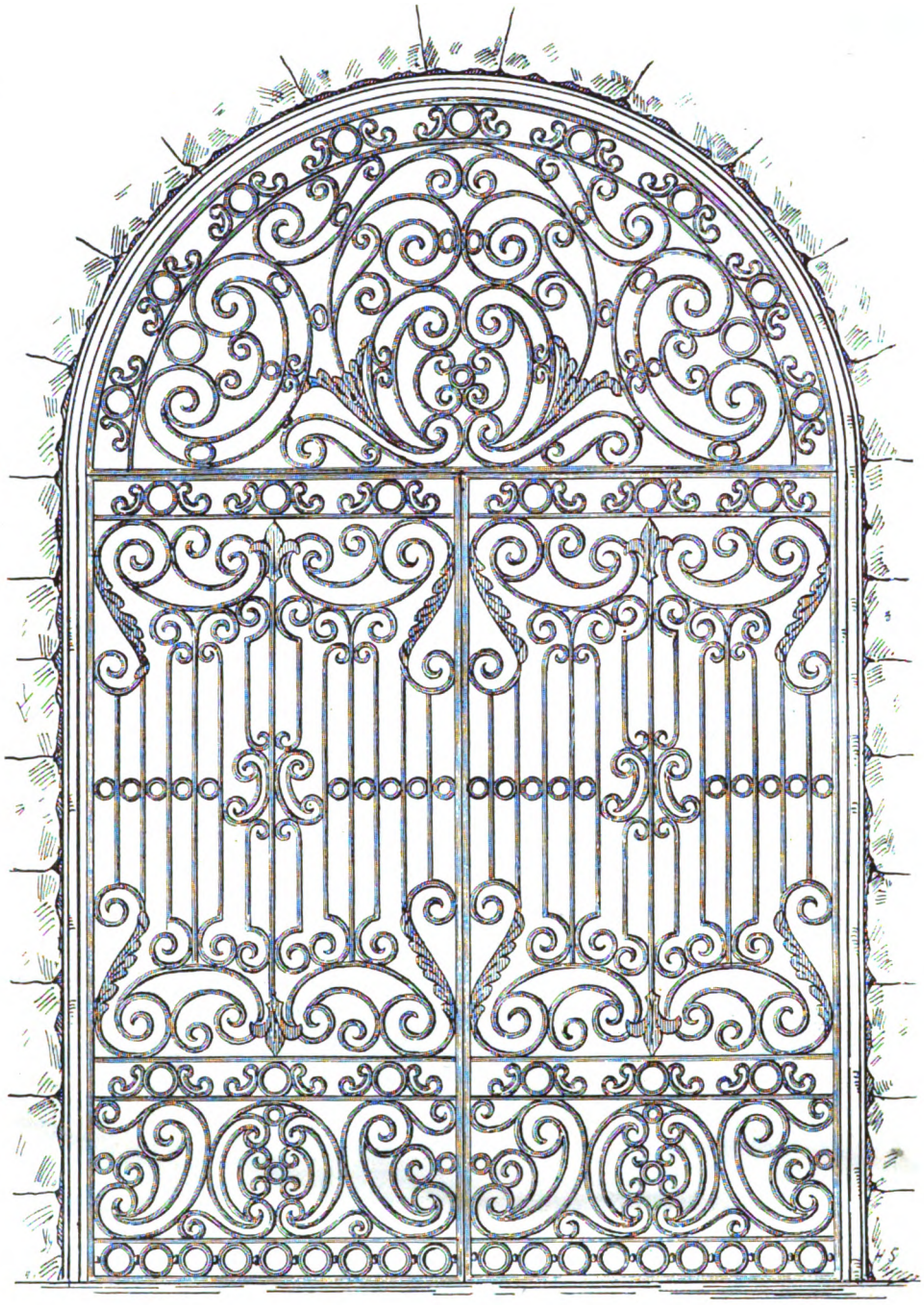
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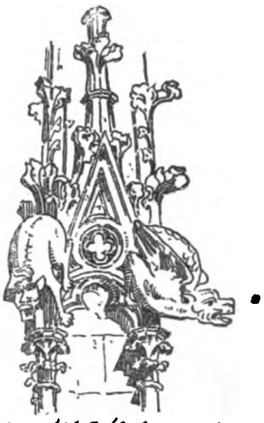
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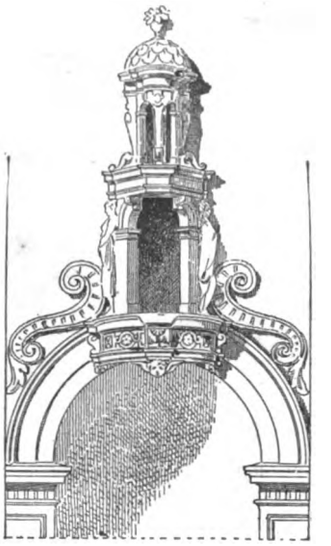
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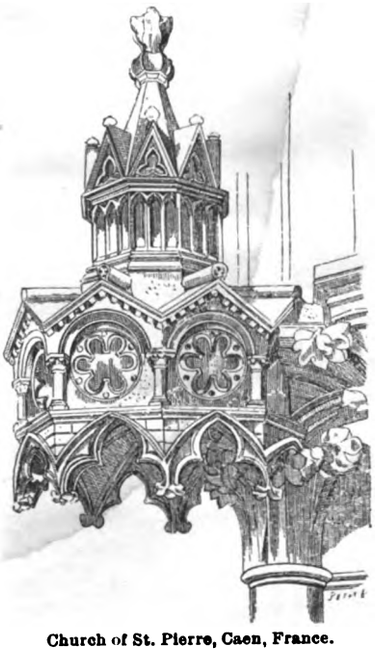


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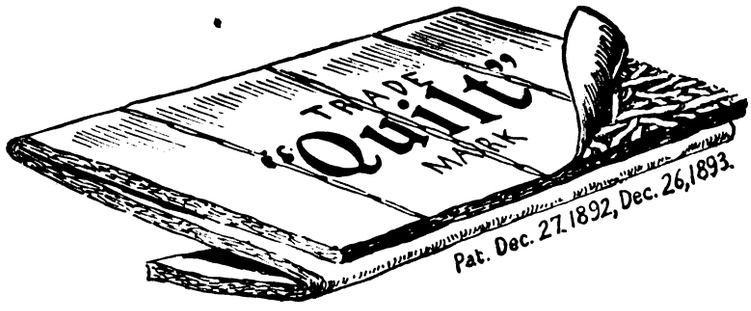
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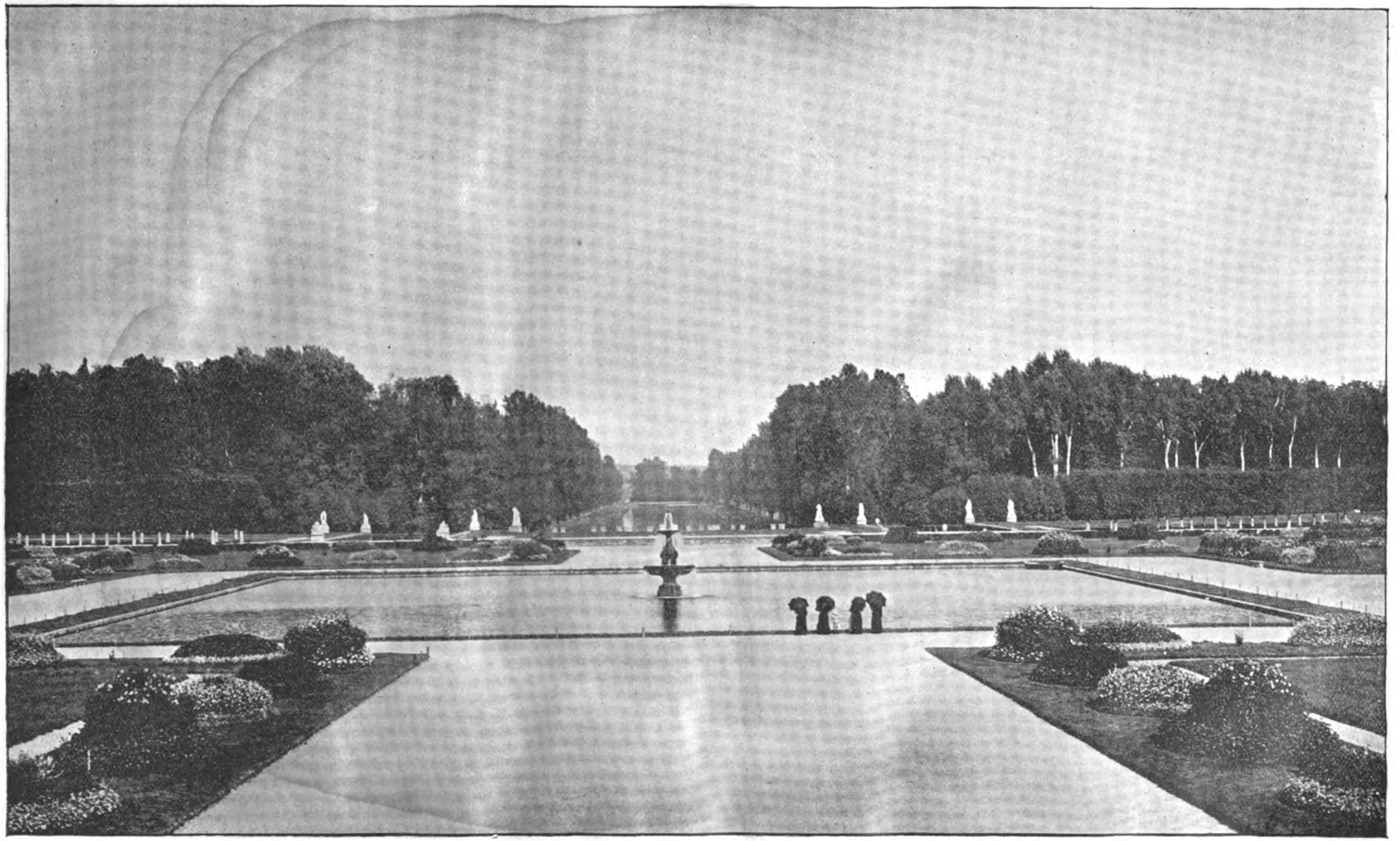
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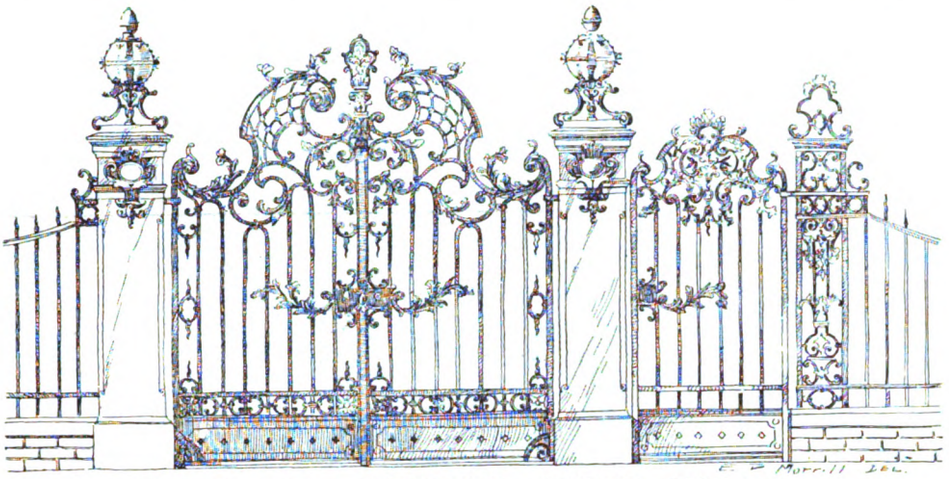
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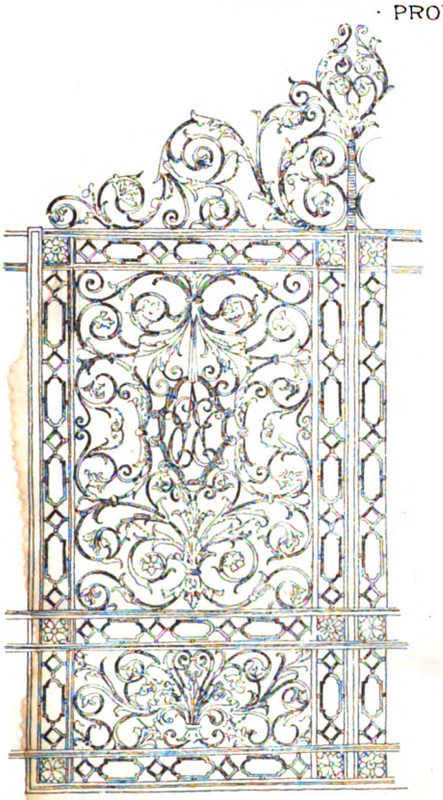
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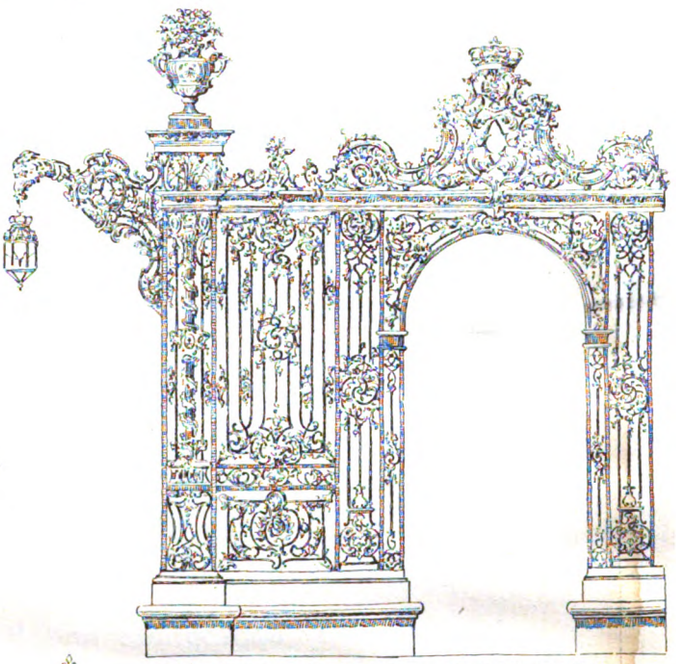
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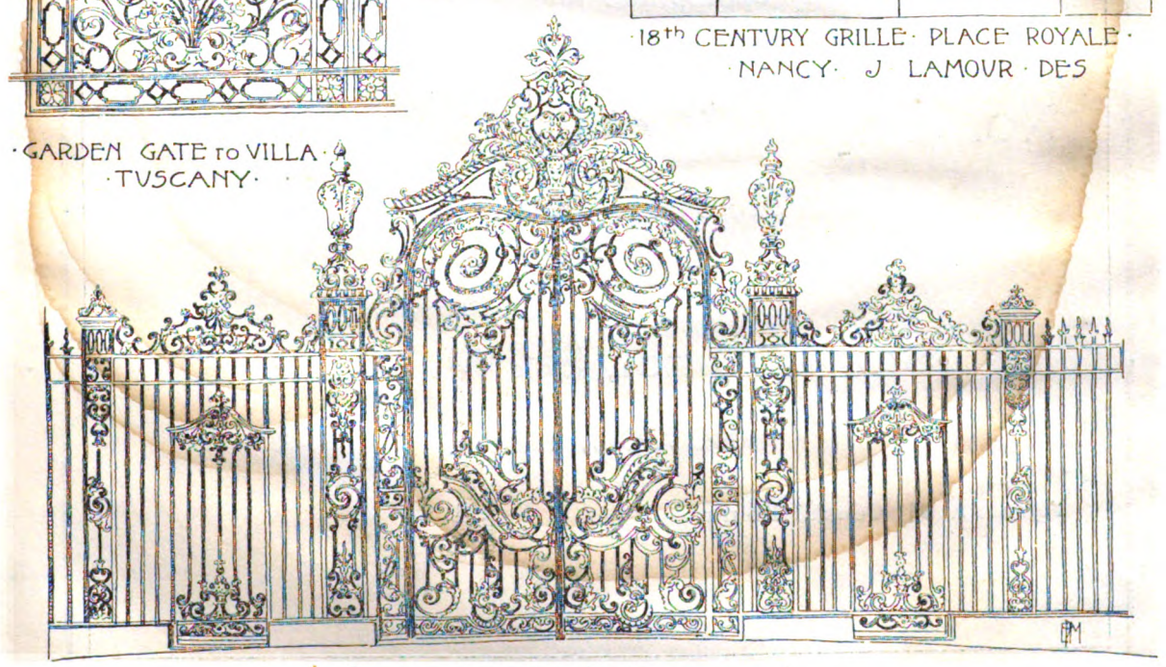
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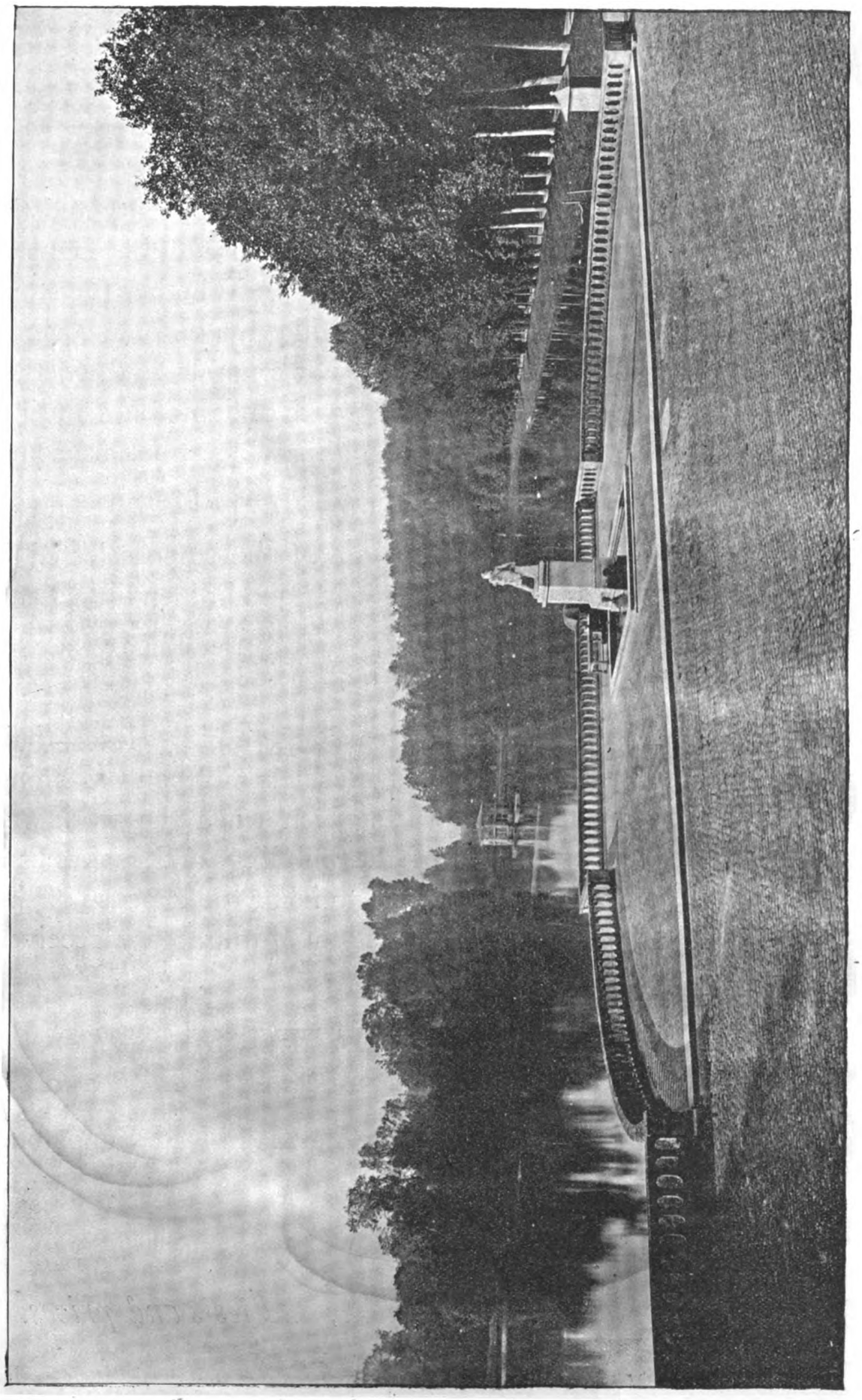
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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXV.



LA COUR D'ULYSSE: PARK OF THE PALACE OF FONTAINEBLEAU.

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POTSDAM RED SANDSTONE

IN THE CHOICE of a building stone, its beauty and the artistic effect which can be secured by its use often seems to be the only motive influencing its selection. Whether the stone will endure without change, whether it will stain, become covered with green or gray efflorescence, decay or crumble, and whether iron will discolor the building in streaks and blotches until it becomes unsightly and grotesque,—all these questions are sometimes overlooked, with a result that can be foreseen. . . . .

THEN the matter of the strength of the stone selected is often deemed of slight consequence, and broken lintels and sills, cracked steps and platforms after a short time show that this also is a matter which should be considered. . . . . .

WHEN fine mouldings and carvings rapidly lose their sharp arrises, and a process of scaling off and washing away destroys the effect which was given when the work was new, changes the appearance of the building, and makes it a question whether it was worth while to incur the expense of the work,—then, if not before, the question of durability receives some attention. . . . . .

A BUILDING STONE SHOULD BE BEAUTIFUL, STRONG AND ABSOLUTELY DURABLE.

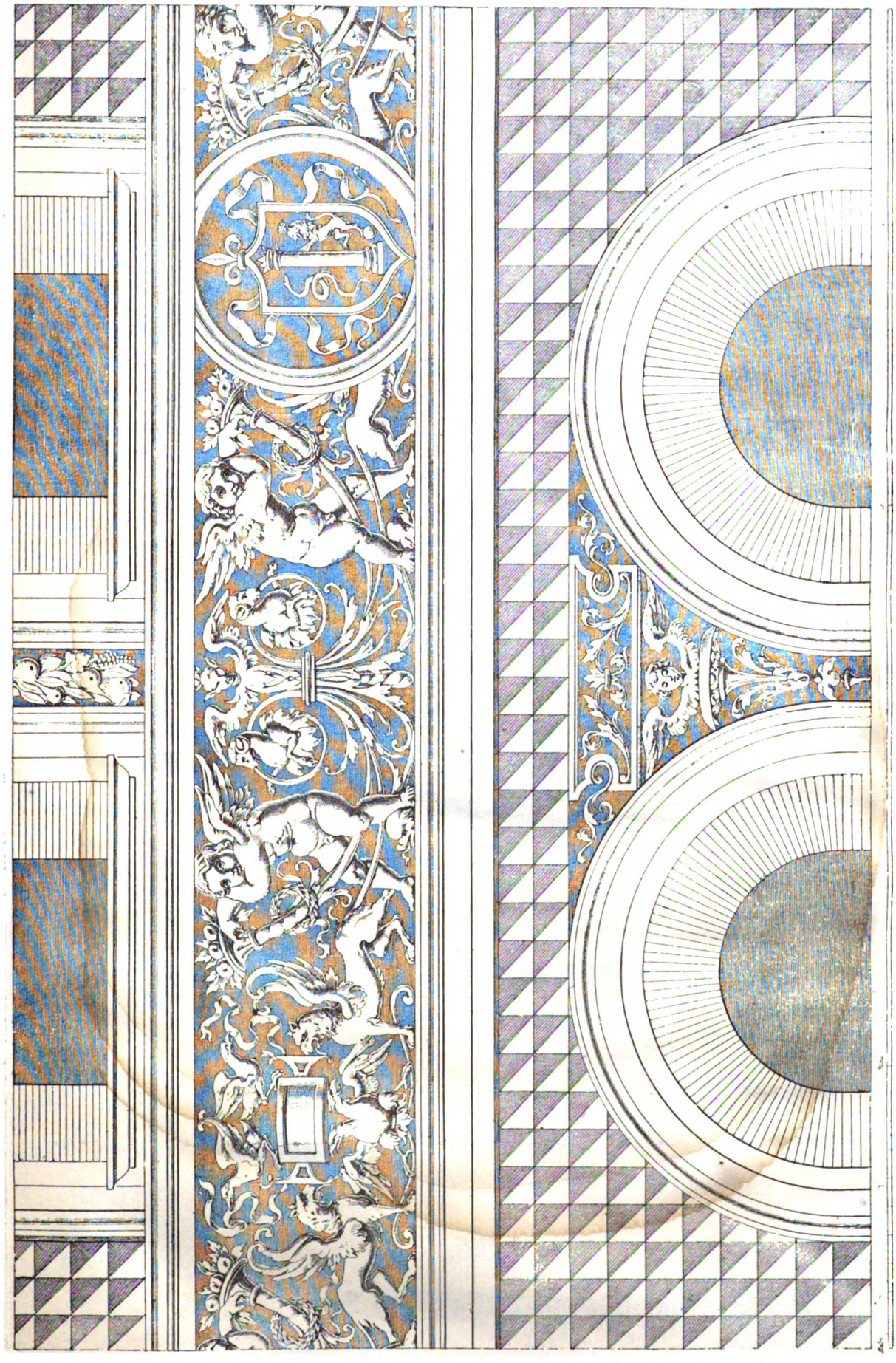
In any one or all of these qualities, Potsdam Red Sandstone stands without a rival.

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Apply to us for samples, expert opinions, and tests and prices.

The Potsdam Red Sandstone Co.
POTSDAM, N. Y.

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Sgraffito Decoration, No. 1, Vicolo Sugarelli, Rome.

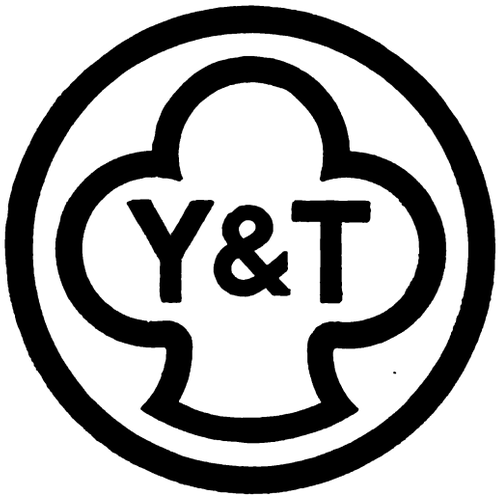
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The Yale Locks,

Builders' Hardware,

Art Metal Work.

All Genuine Yale Trefoil



Hardware bears this Trademark.

The Yale & Towne Manufacturing Co.

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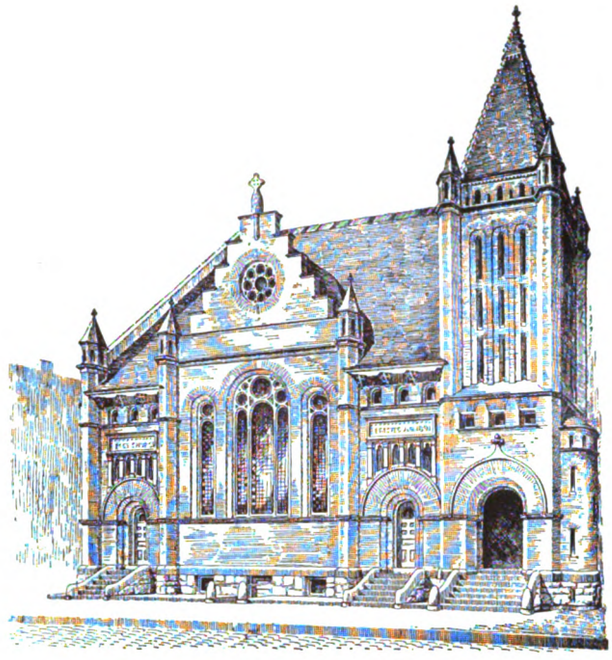
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Works: Stamford, Conn., Branford, Conn.

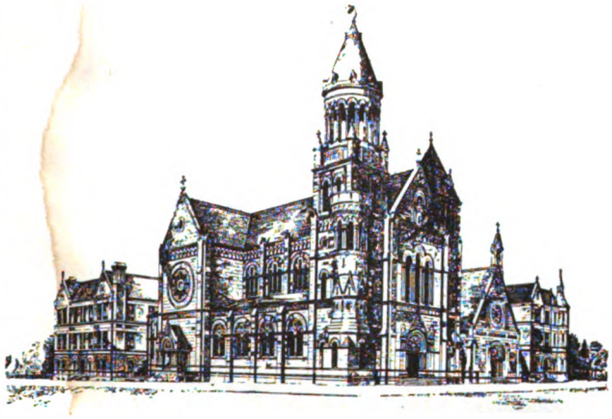
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Lafayette Square Presbyterian Church, Baltimore, Md.



Design for a Church.



Design for Church, Chapel, Parsonage and School.



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URBAN CHURCHES.

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"LICHEN GRAY,"

A NEW SHADE IN

CABOT'S CREOSOTE SHINGLE STAIN.

A Soft, rock-gray with a delicate greenish cast which gives admirably the color effect of a lichen-grown bowlder.

A particularly appropriate and harmonious tone for country houses. It is known as

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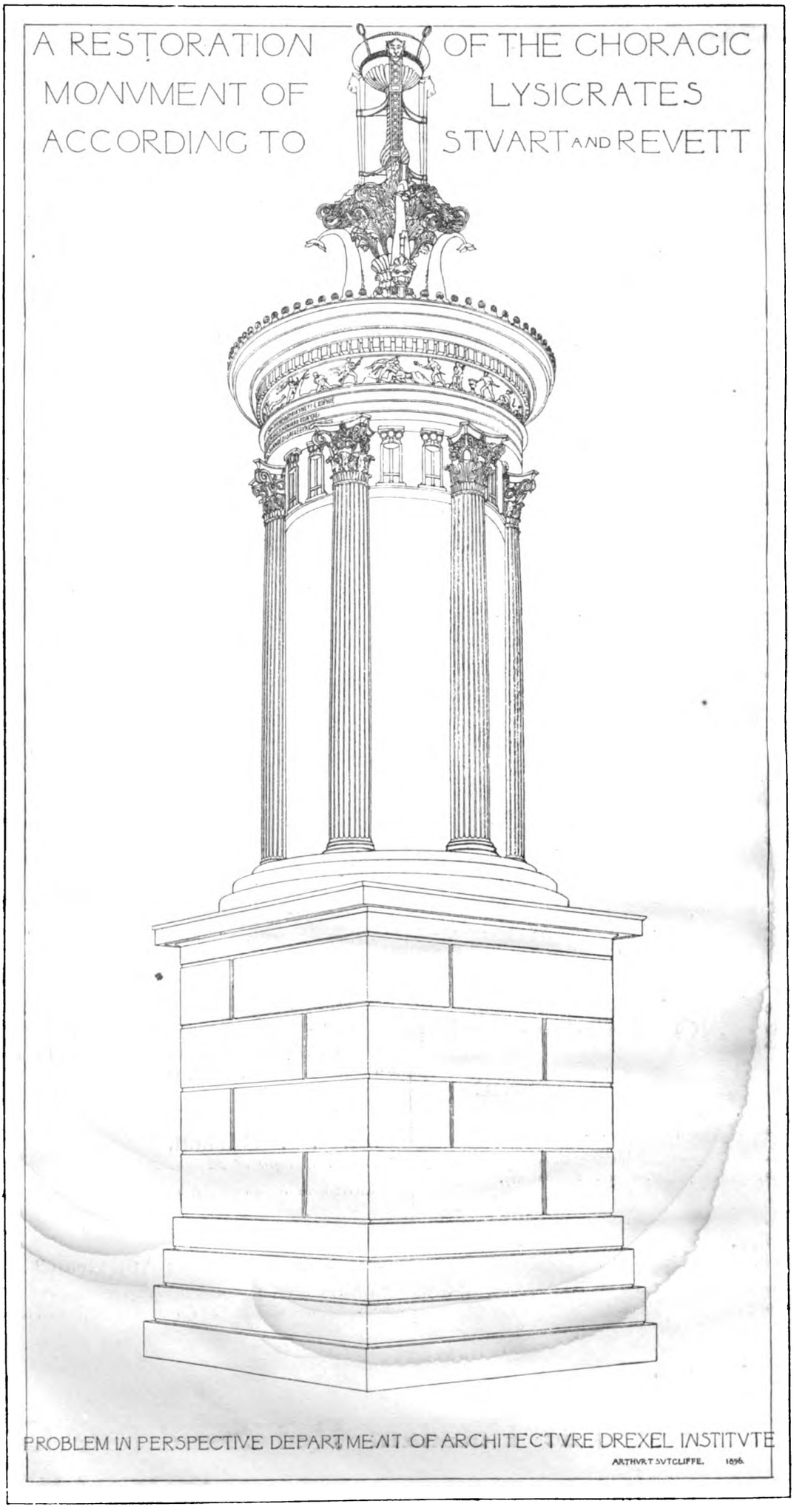
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Potsdam Red Sandstone.

August 20, 1896, the members of the Geological Society of America will visit Potsdam and examine the Quarries of the Potsdam Red Sandstone Co.

Many of the leading Geologists of the United States have already visited these quarries. We append what some of them have said of the stone.

Professor J. S. Newberry,
Professor of Geology of Columbia College School of Mines, Late of the United States Geological Survey, Recipient of the Gold Medal from the Geological Society of London, etc.

"The element of beauty is no less important in a building-stone than strength and durability. In these three qualities this stone is certainly unrivalled. It is stronger than any granite and much more durable."

Dr. George P. Merrill,
Curator of the Department of Geology, Smithsonian Institution, author of "Stones for Building and Decoration," etc., etc.

"I consider this, from the standpoint of durability, almost an ideal stone. . . . Its surface affords no foothold for growing organisms. Strong as the strongest granite."

Professor W. O. Crosby,
of the Department of Economic Geology, Massachusetts Institute of Technology, Boston.

"I cordially endorse all that Professor George P. Merrill says in his 'Stones for Building and Decoration,' (page 273). So far as I know it is unequalled for beauty or durability in this country."

Dr. William C. Day,
of the U. S. Geological Survey. From "Mineral Resources of the United States," Government Printing Office.

"This stone has been most thoroughly tested, and has won a wide reputation for durability and its capacity to withstand the effects of strong heat and sudden cooling. It has been endorsed in a very unqualified manner by many of the leading authorities on structural material in the country."

Dr. William H. Wahl,
Secretary Franklin Institute, Philadelphia.

"Approximates more closely to the ideal building-stone than any other that has thus far been proposed for use in this country."

Prof. R. S. Tarr,
Professor of Geology, Cornell University.

"It is certainly a very beautiful and valuable building-stone, as every one knows who has looked into the subject."

Dr. John C. Smock,
Formerly New York State Economic Geologist, now State Geologist of New Jersey.

"Finds a wide market, and the demand for it is growing as its beauty, strength and durability are better known and appreciated."

Dr. Thomas Egleston,
Professor of Mineralogy, Columbia College, in an Address before the American Society of Civil Engineers, said:

"This is the best of all building-materials."

Prof. Francis A. Wilber,
of Rutgers College, found on testing,—

"There is no loss of weight, in repeated treatment with water containing carbonic-acid gas, and with sulphurous-acid gas. . . . . The test of freezing and thawing left the stone apparently unchanged. When heated to 1,200° to 1,400° Fah. and suddenly cooled, the color was unaltered, and there were no checks."

Prof. Wm. H. Hobbs,
Of the Department of Geology and Mineralogy of the University of Wisconsin.

"Seems to be perfect as a building-material."

Dr. D. A. Sheldon,
New York State Normal College.

"It is certainly a very beautiful building-stone. I can recommend it and do so whenever opportunity offers."

Prof. N. H. Winchell,
State Geologist of Minnesota,

"I have been well aware of its excellence for many years."

From the "Scientific American."

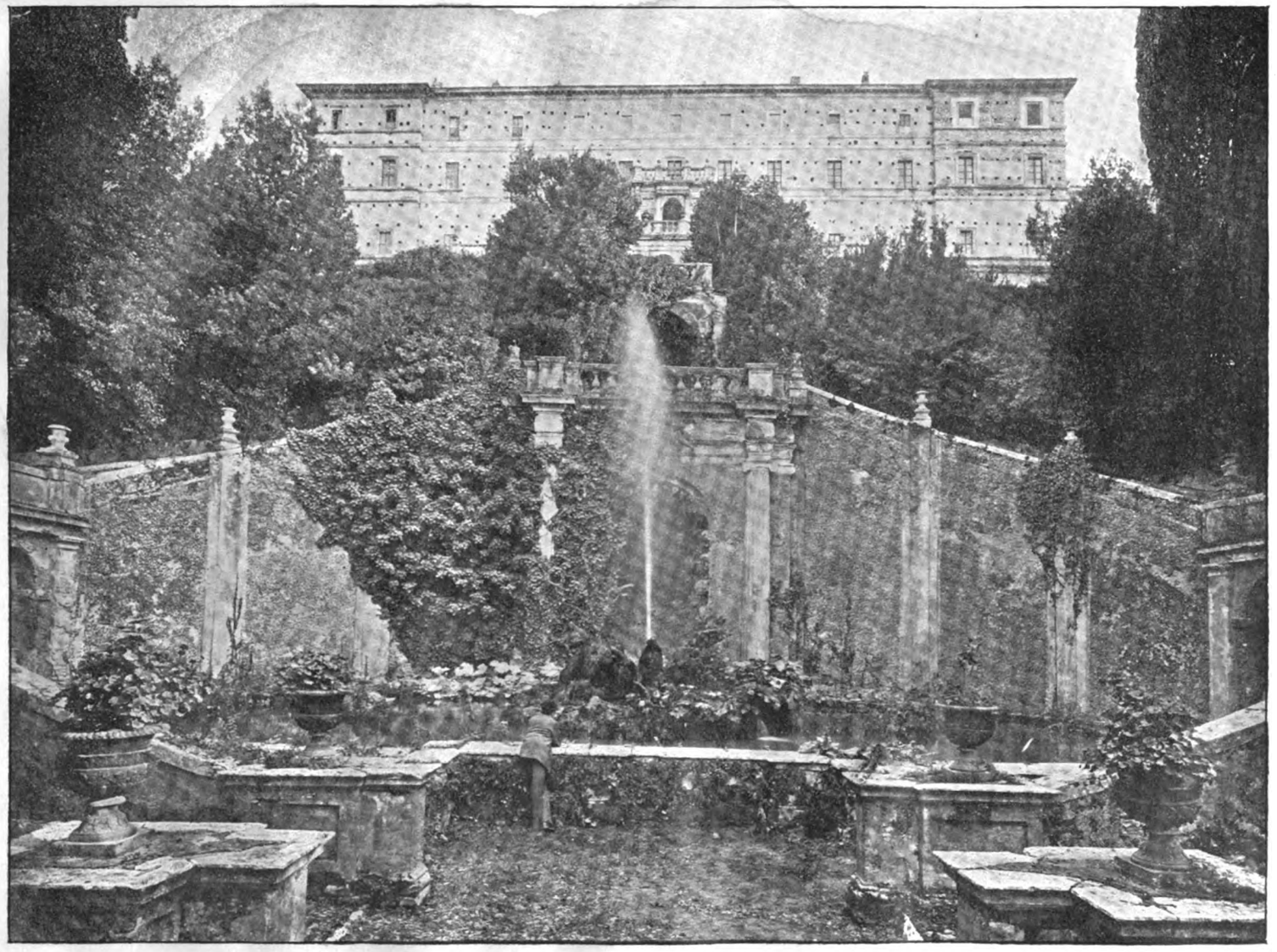
"This remarkable stone has shown a resistance of more than 42,804 lbs. crushing weight. . . . For building purposes it has no equal."

Address,

The Potsdam Red Sandstone Co.
POTSDAM, N. Y.

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXVI.



STAIRWAY APPROACH TO THE VILLA D' ESTE, TIVOLI, ITALY.

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The Yale & Towne Mfg. Co.



Ornamentation—Marengo.
School—Empire.
Size: 19 x 2½ inches.

The Yale Locks
Builders' Hardware
Art Metal Work

All Genuine Yale Hardware bears this Trefoil Trademark.

Y&T

Hardware of Ornament in great variety and in all schools. Architects' Designs skillfully rendered.

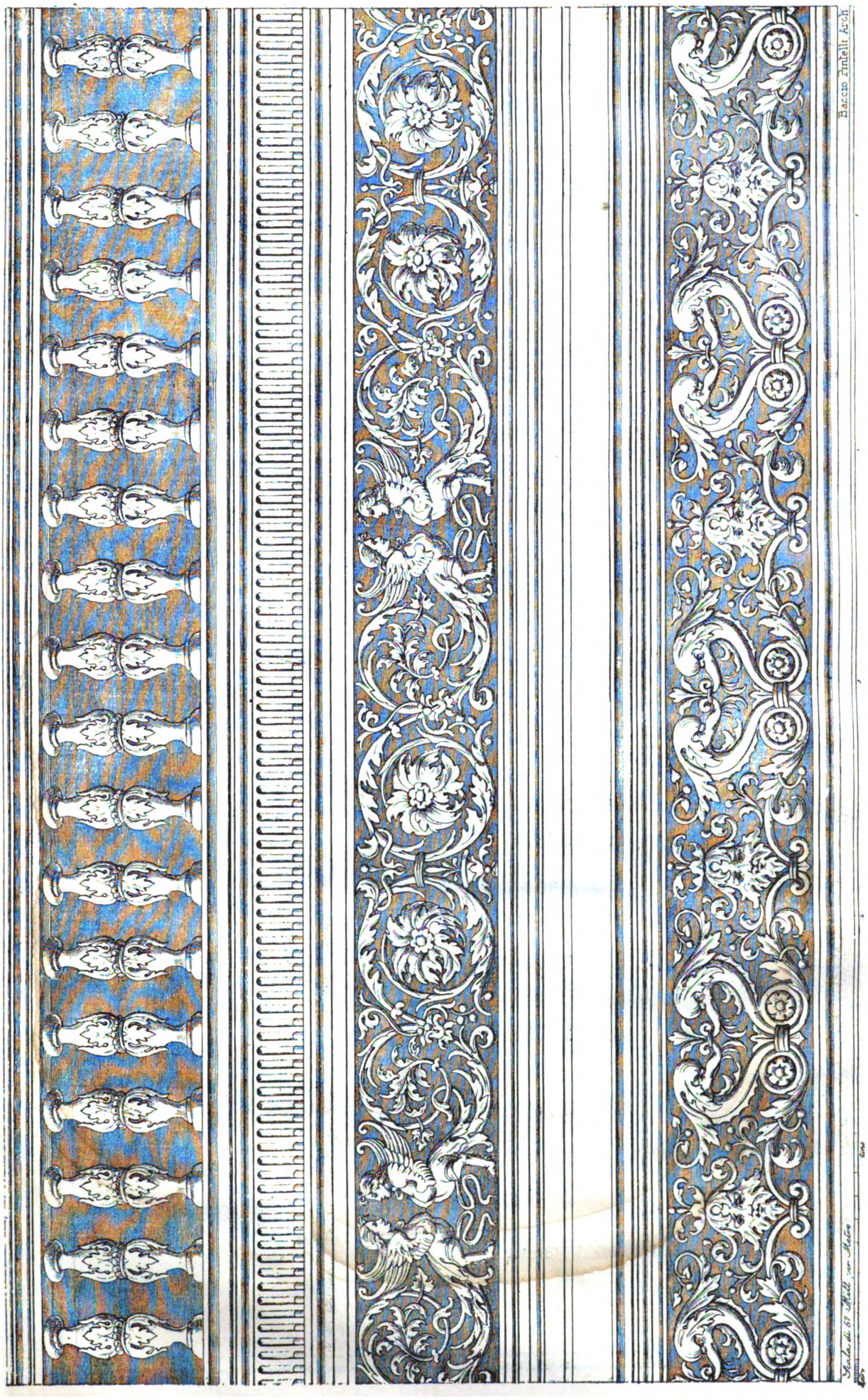
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XV Century Sgraffito in Court-Yard of the Collegio Penitenzieri, Piazza Scossa Cavalli, Rome, Italy.

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"LICHEN GRAY,"

A NEW SHADE IN

CABOT'S CREOSOTE SHINGLE STAIN.

A Soft, rock-gray with a delicate greenish cast which gives admirably the color effect of a lichen-grown bowlder.

A particularly appropriate and harmonious tone for country houses. It is known as

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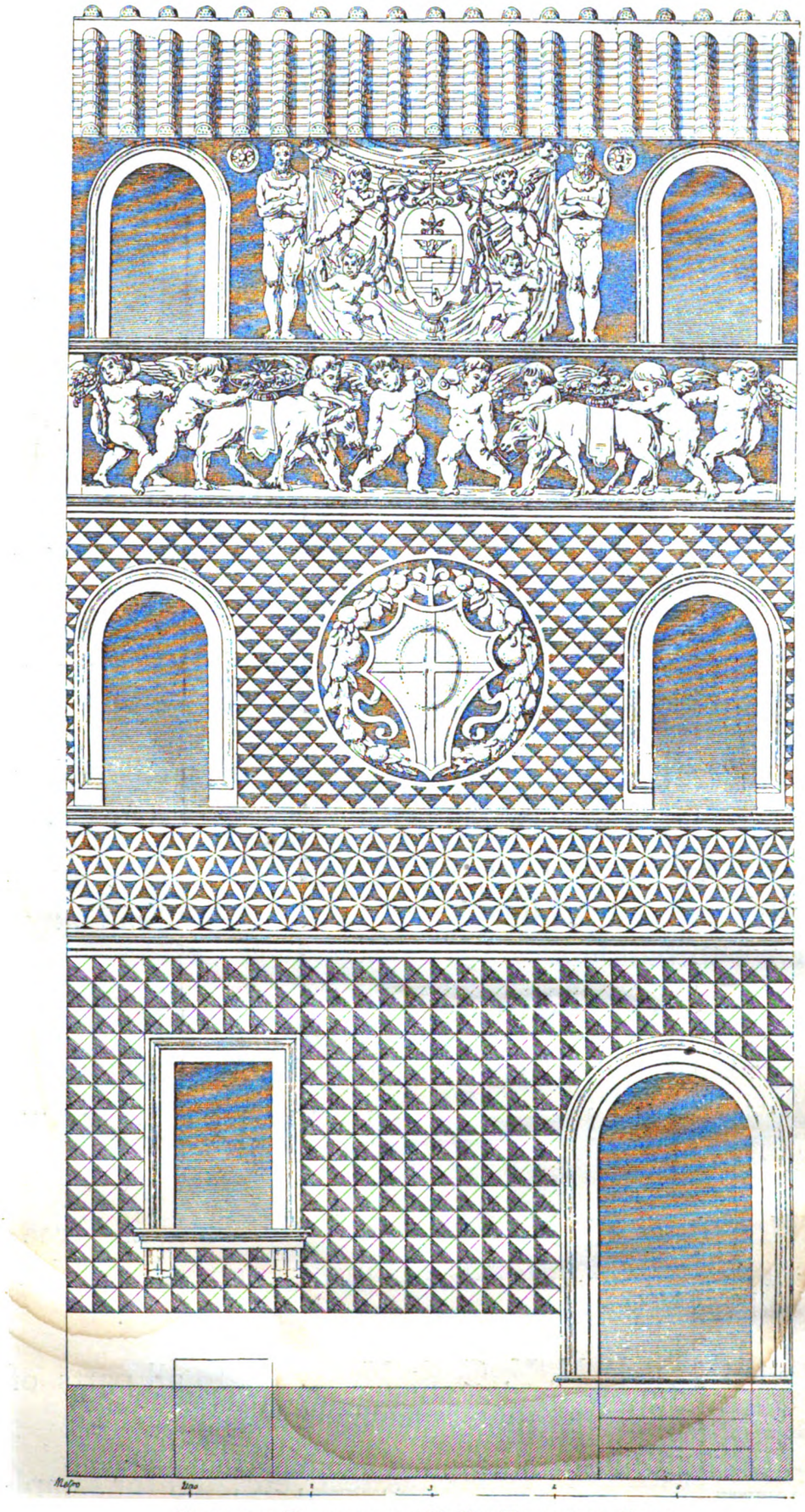
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Sgraffito Decoration, 103 Via Tomacelli, Rome.

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POTSDAM RED SANDSTONE....

* * * * * *

Endorsed without Reserve by the highest scientific authorities in the United States.

Strongest Stone Known. 42,840 pounds to the inch, crushing test; over ten times stronger than some of the other sandstones and limestones.

Most Durable Stone, being composed of pure silica, a substance unaffected by exposure to the elements.

Fireproof. Superior to the best firebrick for lining furnaces and retorts.

Excelled by no Building Stone in beauty of color and effect.

On Account of Perfect Natural Beds, and that it breaks true and even under the hammer, this stone can be made into rock-faced wall-facings more cheaply (for good work) than any other stone known to builders.

Can be Set on Edge for Wall-Facings and Belt-Courses with the absolute assurance that it will withstand exposure indefinitely.

Can be Sawed, Rubbed and Carved with the same facility as the better granites.

Blocks of any Transportable Size, perfectly sound and free from flaws are quarried. Platforms of unsurpassed size and nearly parallel beds.

Shipping Facilities, via N. Y. C. & H. R. R., to all parts of the country at low rates and with sure connections.

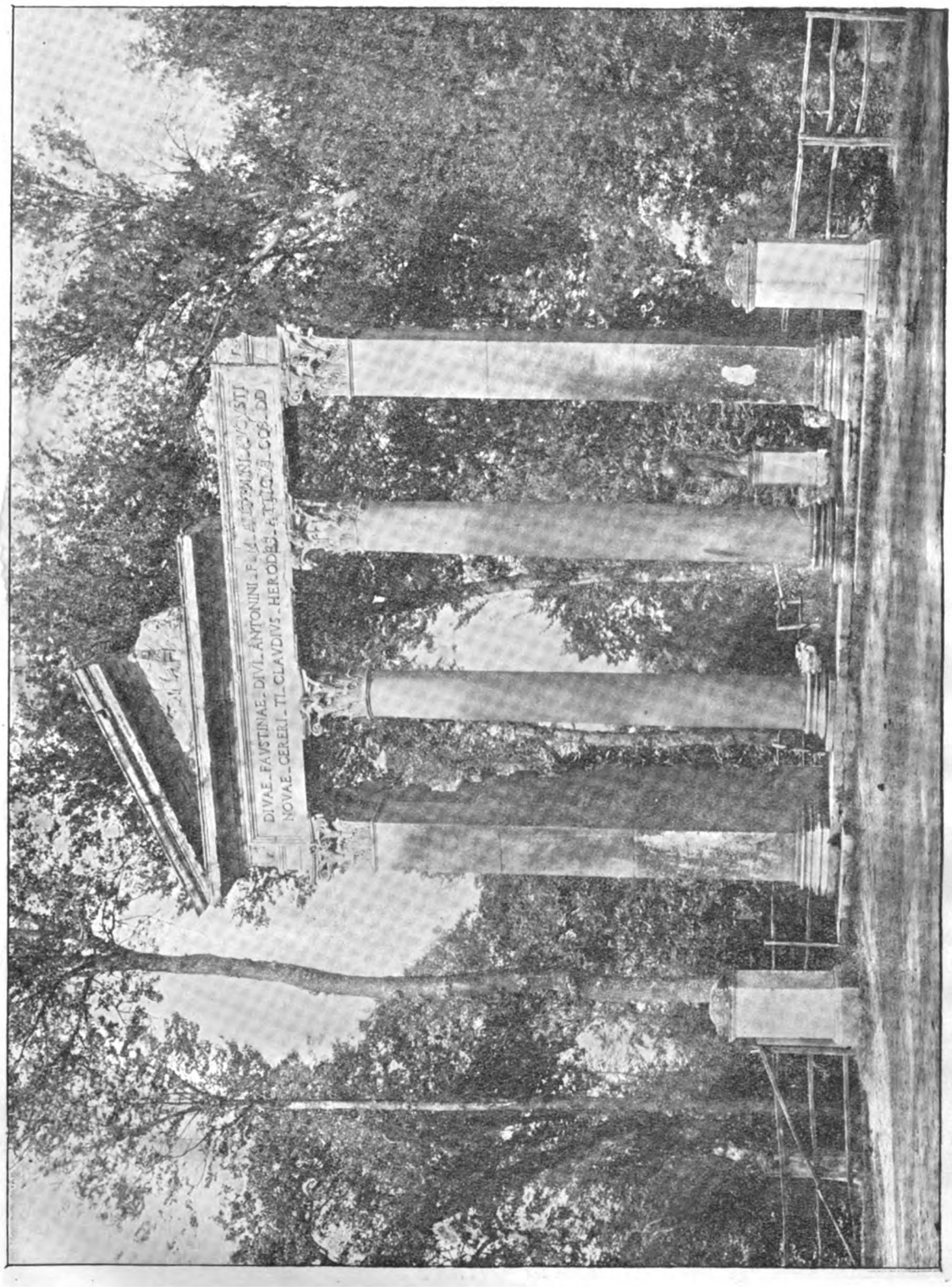
Send for Circular with expert opinions, tests, etc., and for samples to

The Potsdam Red Sandstone Co.

POTSDAM, N. Y.

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TEMPLE OF FAUSTINA AND ANTONINUS, IN THE GARDENS OF THE VILLA BORGHESE, ROME.

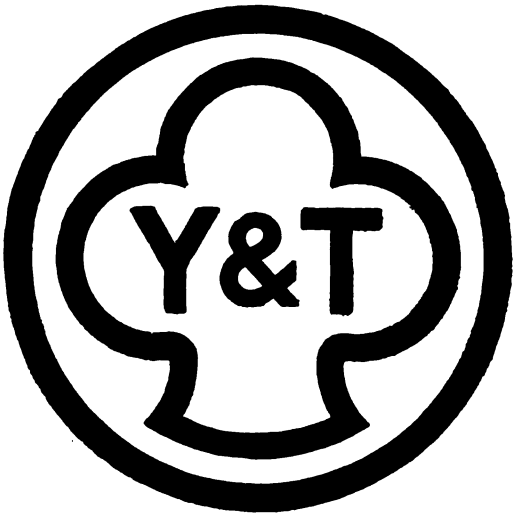
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The Yale Locks,

Builders' Hardware,

Art Metal Work.

All Genuine Yale Trefoil



Hardware bears this Trademark.

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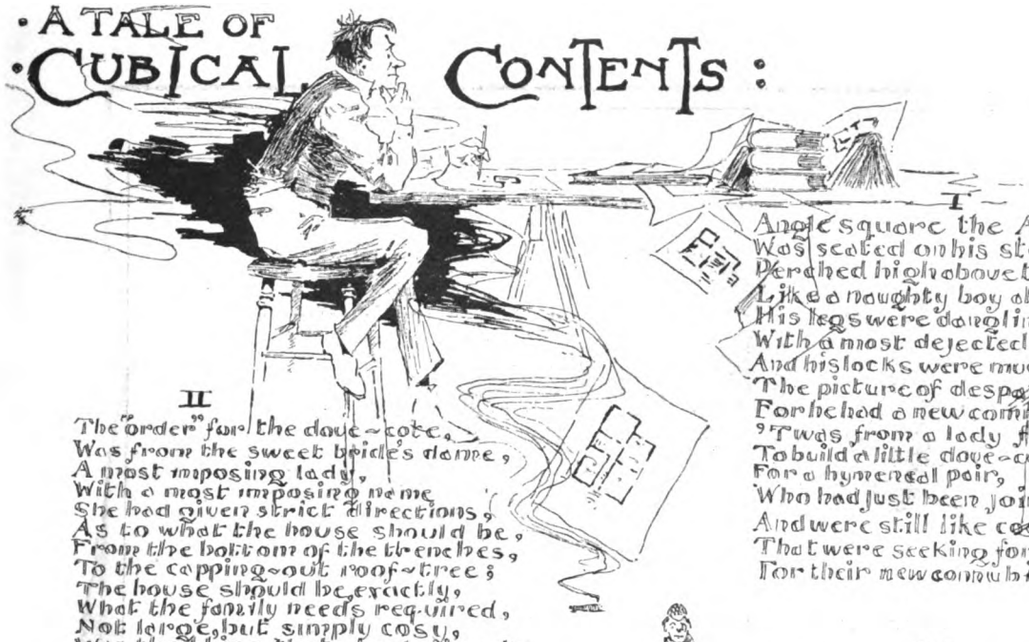
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A TALE OF CUBICAL CONTENTS:



I

Anglesquare the Architect,
Was seated on his stool,
Perched high above the table,
Like a naughty boy at school,
His legs were dangling downward,
With a most dejected air,
And his locks were much dishevelled,
The picture of despair,
For he had a new commission,
'Twas from a lady fair,
To build a little dove-cote,
For a hymeneal pair,
Who had just been joined in wedlock,
And were still like cooing doves,
That were seeking for a shelter,
For their new connubial loves;

II

The "order" for the dove-cote,
Was from the sweet bride's dame,
A most imposing lady,
With a most imposing name
She had given strict directions,
As to what the house should be,
From the bottom of the trenches,
To the capping-out roof-tree;
The house should be exactly,
What the family needs required,
Not large, but simply cosy,
Was the thing that she desired:
The cooing doves should have a room,
Of chaste and pure design,
All pink and white and rosy,
That should speak of love divine:
There should be a room for old mama,
For of course she'd not be spared,
But would watch with tender interest,
The joys the dovelets shared;
One room should be provided,
For any transient guest,
Who should happen in upon them,
In need of quiet and rest:



III.

Beyond these few requirements,
And the usual rooms below,
And she knew her mind exactly,
She did not care to go:
But Anglesquare suggested,
With practical foresight,
That if things went on as usual,
In time, he thought, there might
Be need of larger quarters
For this loving, cooing pair;
But mama was quite indignant,
And said with haughty air,
"I've made my calculations,
"And we'll have room to spare".



IV.

So Anglesquare the Architect,
Was perched upon his stool,
With his legs a-dangling downward,
Like a naughty boy at school,
And his locks, so much dishevelled
Had a most dejected air,
And he pondered on the problem,
The picture of despair:
For he was conscientious,
And from sad experience knew,
That from one pair of dovelets,
Oftimes a family grew:
Yet instructions so explicit,
Must be at once obeyed
And he slanted on his drawings,
Although at heart dismayed,
And soon the little dove-cote,
Was on his sheets displayed:
It met the approbation,
Of mama and dovelets, too,
And soon was in construction,
And to completion grew



V

They moved in bag and baggage,
And 'twas a pretty sight,
To see the gentle dovelets,
A-nestling for the night:
The happy days sped on, and on,
The dovelets billed and cooed,
But Anglesquare the Architect,
Still sat in gloomy mood,
His fears, they still persisted,
He knew the time would come,
When the dovelets in confusion,
Would regret what they had done:

VI.

Alas; the fatal time arrived,
Much sooner than expected,
The dove-cote, now not large enough,
Must be at once rejected.
And thus it's shown, in human life,
That prudent foresight wins,
The dovelets found to their dismay,
That their very first, were twins.
The moral of this tale is told,
In few words, and concise,
When building houses, always take
Your Architects advise.

H·T·E·WENDELL.



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"LICHEN GRAY,"

A NEW SHADE IN

CABOT'S CREOSOTE SHINGLE STAIN.

A Soft, rock-gray with a delicate greenish cast which, gives admirably the color effect of a lichen-grown bowlder.

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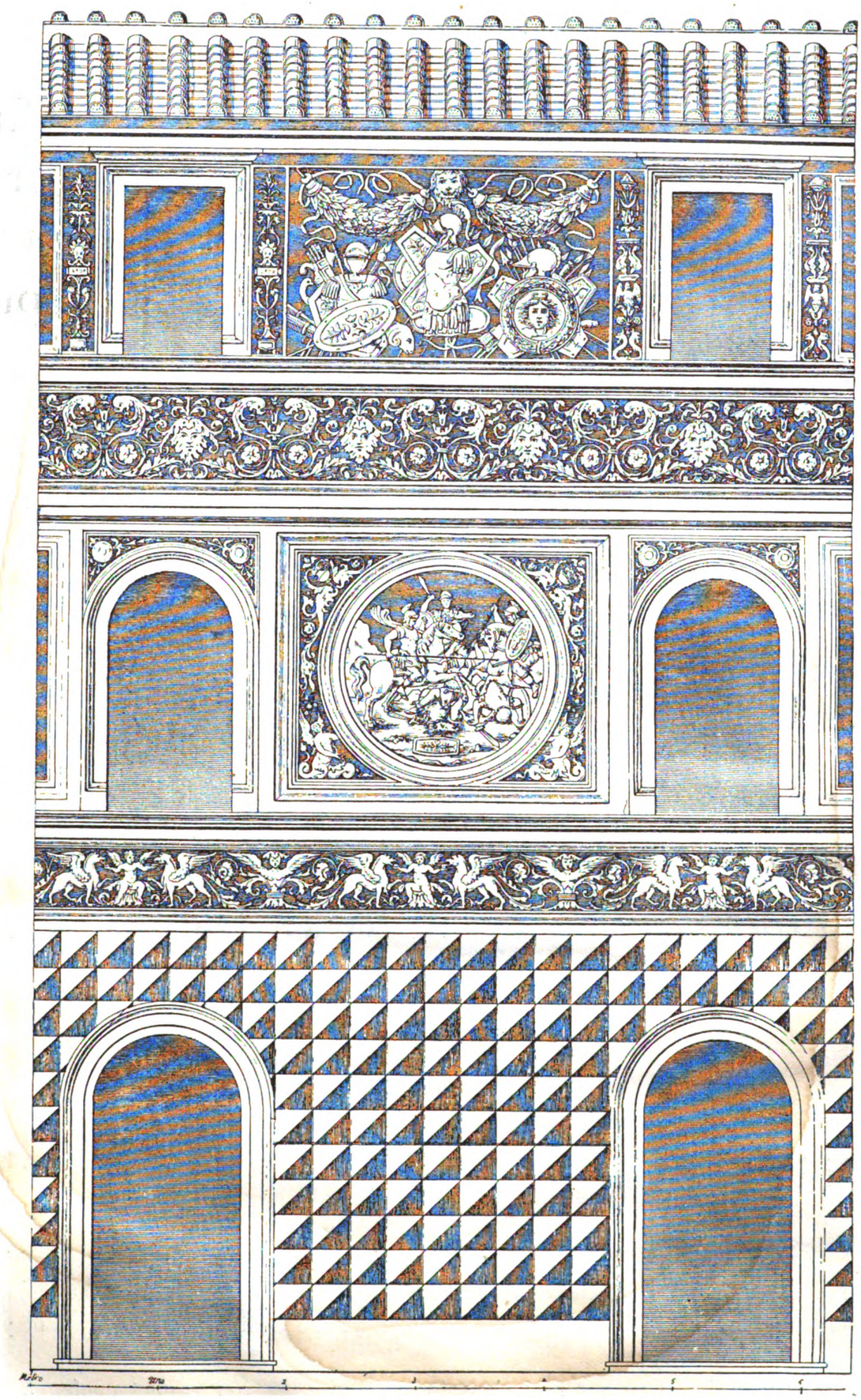
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SGRAFFITO DECORATION IN THE VICOLO CELLINI, ROME.
ASCRIBED TO BENVENUTO CELLINI.

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POTSDAM RED SANDSTONE....

An architect who has used our stone for a number of fine buildings in the past year or two, said that he did so because, "It is better to use the best building-stone at a fair price than poor material for nothing."

But the argument that Potsdam stone costs so much is being overcome. Improved facilities are making reduced cost possible, and alternative specifications which include other good stones with ours, much more often result in our favor than they used to.

Of course, mahogany costs more than hemlock and always will, but when it is a question of mahogany, cherry or oak, the matter of appearance can be given due weight.

WE ARE IN THE MARKET

to sell POTSDAM RED SANDSTONE, and we are selling it. Its qualities and appearance are pretty well known to architects; — that it can be had at competitive prices is not so well known and this is what we are anxious to prove. Will you not give us the opportunity?

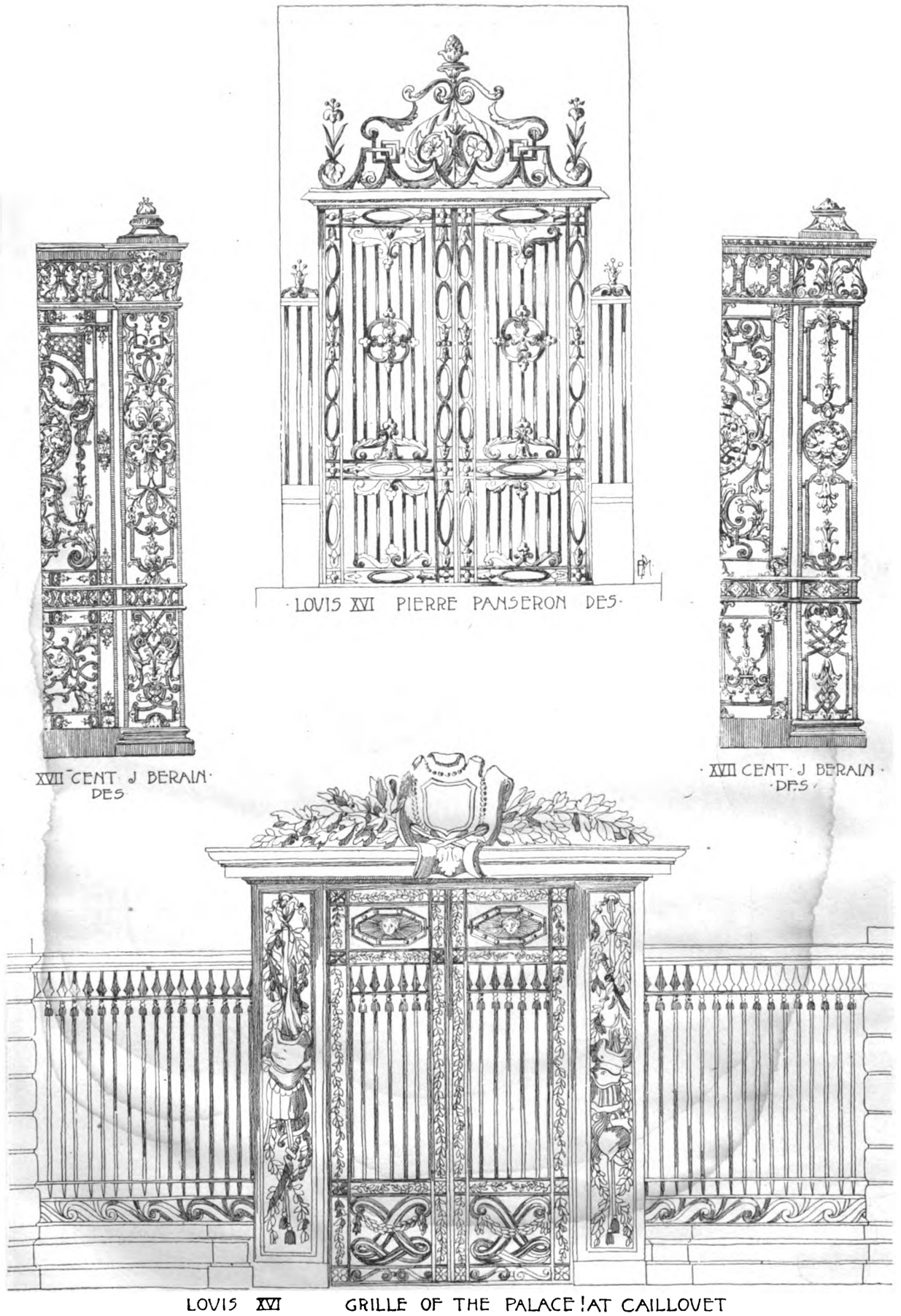
If you will send us a set of plans for an estimate, you cannot confer a greater favor, because we always get a certain proportion of those we figure. Drawings returned same day they are received.

Address all communications to

The Potsdam Red Sandstone Co.

POTSDAM, N. Y.

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WROUGHT-IRON GATES.

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The Yale & Towne Mfg. Co.



Ornamentation—Marengo.
School—Empire.
Size: 19 x 2½ inches.

The Yale Locks
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All Genuine Yale Hardware bears this Trefoil Trademark.

Y&T

Hardware of Ornament in great variety and in all schools. Architects' Designs skillfully rendered.

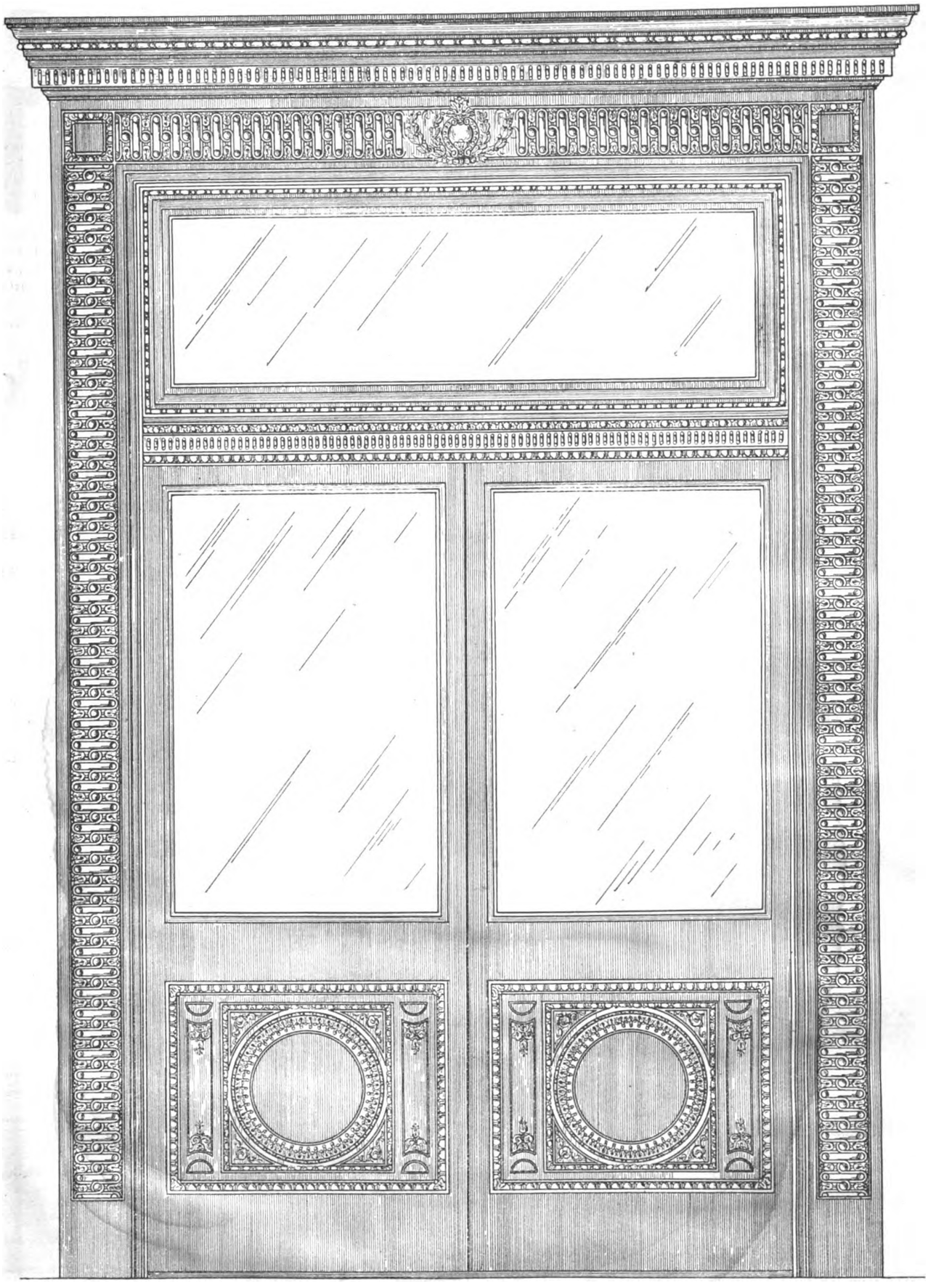
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WILLIAM R. PITT COMPOSITE
IRON WORKS.

ELEVATOR ENCLOSURE,
MUNSEY BUILDING,
NEW LONDON, CONN.

WILLIAM BURNETT TUTHILL,
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WE MANUFACTURE AND PUT IN PLACE ALL KINDS OF IRONWORK FOR BUILDINGS, ALSO ARTISTIC WROUGHT-IRON WORK GRILLES, GATES AND RAILINGS.

WE MAKE A SPECIALTY OF ALL KINDS OF FOLDING GATES, "BOSTWICK PATENT" AND PITT PATENT GATES, MADE IN STEEL, BRASS AND BRONZE METAL. THESE GATES ARE USED TO PROTECT THE DOORS AND WINDOWS OF PRIVATE RESIDENCES, BANKS AND SAFE DEPOSIT VAULTS. SEND TO US FOR ESTIMATES.

THE WILLIAM R. PITT COMPOSITE IRON WORKS,

123 Fifth Avenue, New York City.

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DYCKERHOFF
PORTLAND CEMENT

Is superior to any other Portland Cement made. It is very finely ground, always uniform and reliable, and of such extraordinary strengty that it will permit the addition of 25 per cent more sand, etc., than other well-known brands, and produce the most durable work. It is therefore the most economical to use. The foundations (and in some cases the brick walls) of nearly all the large Insurance, Bank, Office and Newspaper buildings, Hotels, Monuments, etc., erected in New York and other cities during the last ten years have been constructed of the DYCKERHOFF CEMENT. Architects and those interested in Portland Cement will please send for my pamphlet. It contains valuable directions for the emu ployment of Portland Cement, a table of results of the strength of the Dyckerh off Cement when mixed with sand and broken stone in va riou proportions, together with tests and testimonials.

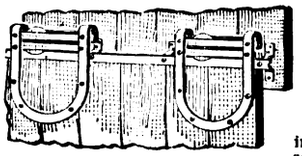
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SOLE AGENT FOR THE UNITED STATES.

LUDLOW SAYLOR WIRE CO.
No. 114 & 116 So. Fourth St. ST. LOUIS, MO.



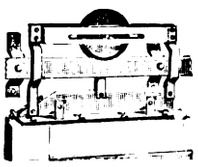
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LANE'S PATENT STEEL BARN DOOR HANGER!



Anti-friction. Most complete in construction. Material the best. No breakage. Ease of movement. Always in order.

LANE'S Patent Noiseless Steel Parlor Door Hanger.

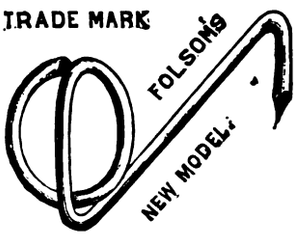


Hanger is made of steel throughout, including wheel, except the filling which deadens the sound. Single steel track instead of double wood rail. Ask your Hardware Dealer and send for Circular.

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For Old and New Roofs

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Heliotype Printing Co.....[*Art Printing.*]
Massachusetts Fan Co.....[*Ventilating Fan.*]
Moore & Wyman.....[*Elevators.*]
New England Felt Roofing Works...[*Roofing.*]
Samson Cordage Works.....[*Sash-Cord.*]

MASSACHUSETTS.

Spaulding Print Paper Co.....[*Blue Prints.*]
Waldo Bros.....[*Masons' Supplies.*]
Whittier Machine Co.....[*Elevators.*]
Worthley, F. O.....[*Oat Manger.*]

Clinton.
Clinton Wire Cloth Co.....[*Metallic Lathing.*]

Palmer.
Flynt Building & Construction Co...[*Building Contractors.*].....

Springfield.
Elektron Mfg. Co.....[*Elevators.*]

MARYLAND.

Baltimore.
Baltimore Terra-Cotta Co.....[*Terra-Cotta.*]
Vaile & Young.....[*Skylights.*]

MISSOURI.

St. Louis.
Hydraulic-Press Brick Co.....[*Bricks.*]
Ludlow Saylor Wire Co.....[*Art Metal-Work.*]

NEW JERSEY.

Beach Haven.
Sherborne, C. E.....[*Perspectives.*]

Camden.
Montross Metal Shingle Co..[*Metal Shingles.*]

Jersey City.
Dixon Crucible Co. Jos.....[*Graphite.*]
National Sheet Metal Roofing Co.....[*Metal Shingles.*]

Newark.
Murphy Varnish Co.....[*Varnish.*]
Storm Mfg. Co.....[*Dumb Waiters.*]

Paterson.
Passaic Rolling Mill Co.....[*Structural Iron.*]

Perth Amboy.
Perth Amboy Terra-Cotta Co... [*Terra-Cotta.*]

Trenton.
N. J. Steel & Iron Co.....[*Iron.*]
New Jersey Wire Cloth Co.....[*Metallic Lath.*]

NEW YORK.

Brooklyn.
Chrome Steel Works.....[*Chrome Steel.*]

Irvington-on-Hudson.
Lord & Burnham Co.....[*Conservatories.*]

New York City.
Aeschlimann & Pellarin.....[*Marble Mosaics.*]
Alsen's Cement Works.....[*Cements.*]
American Boiler Co... .[*Heating Apparatus.*]

NEW YORK.

Armstrong & Co., Maitland....[*Stained-Glass.*]
Babcock & Wilcox.....[*Boilers.*]
Bicklehoupt, G.....[*Skylights.*]
Brooks, Shoobridge & Co.....[*Cements.*]
Caffall Bros.....[*Waterproofing Masonry.*]
Clark, Bunnett & Co.....[*Ceiling Shutters.*]
Columbia University.....[*School.*]
Continental Insurance Co.....[*Insurance.*]
Deane, E. Eldon.....[*Colorist.*]
Devoe & Co., F. W.....[*Paints.*]
Fisher & Co., Robert C.....[*Marble.*]
Frank, I. P.....[*Reflectors.*]
Galt & Sons, John.....[*Roofing Slate.*]
Gorton & Lidgerwood Co.....[*Boilers.*]
Hayes, George.....[*Metallic Lathing.*]
Hessling, Bruno...[*Architectural and Decorative Works.*].....
Hill, George.....[*Consulting Engineer.*]
Hitchings & Co.....[*Greenhouses.*]
Jackson & Co., Wm. H.....[*Grates.*]
Jackson Architectural Iron Works.[*Iron Work.*]
Jacobson Manufacturing Co.....[*Ceiling and Wall Decorations.*].....
Jenkins Bros.....[*Valves.*]
Johns Mfg. Co., H. W.....[*Asbestos.*]
Jones, T. W.....[*Vanes.*]
Lorillard Refrigerator Co....[*Refrigerators.*]
Lowinson Oscar.....[*Civil Engineers.*]
Maurer & Son, Henry.....[*Fireproofing.*]
Meyer-Sniffen Co., L't'd..[*Plumbing Fixtures.*]
Miller & Coates.....[*Bath-Tubs.*]
McKim, Alex. Rice.....[*Consulting Engineer.*]
Mott Iron Works, J. L.....[*Bath-Tubs.*]
National Wood Mfg. Co.....[*Inlaid Floors.*]
Neuchatel Asphalte Co.....[*Asphalt.*]
N. Y. Architectural Terra-Cotta Co.....[*Terra-Cotta.*].....
New York Mastic Works.....[*Asphalt.*]
N. Y. Metal Ceiling Co.....[*Metal Ceilings.*]
Okonite Co. (Ltd.).....[*Insulated Wire.*]
Ostrander & Co., W. R.....[*Annunciators.*]
Otis Bros. & Co.....[*Elevators.*]
Pitt, W. R.....[*Folding-Gates.*]
Raritan Hollow & Porous Brick Co..[*Fireproofing.*].....
Sargent & Co.....[*Builders' Hardware.*]
Smith Co., H. B.....[*Steam Heat.*]
Thiele, E.....[*Portland Cement.*]
United States Mineral Wool Co.....[*Mineral Wool.*]
Warren Chemical & Mfg. Co.[*Asphalt Roofing.*]
Williams, John.....[*Wrought Metal.*]
Wilson, Jas. G.....[*Rolling-Shutters.*]
Worthington, Henry R.....[*Pumps.*]

Port Chester.
Mertz's Sons. George.....[*Art Mouldings.*]

Potsdam.
Potsdam Red Sandstone Co.....[*Building Stone.*].....

Poughkeepsie.
Lane Bros. .....[*Door Hangers.*]
Mitchell Heater Co.....[*Heating Apparatus.*]

Rochester.
Cutler Mfg. Co.....[*Mail Chutes.*]
Graves Elevator Co.....[*Elevators.*]
Wood-Mosaic Co. .....[*Hardwood Floors.*]

NEW YORK.

Schenectady.
General Electric Co..[*Electrical Equipments.*]

Syracuse.
Stearns & Co., E. C....[*Parlor Door Hangers.*]

Troy.
Globe Ventilator Co.....[*Vent-Inters.*]
Troy Laundry Machinery Co...[*Washing Machines.*].....

OHIO.

Cleveland.
Brooks, T. H. & Co.....[*Sidewalk Lights.*]
Cudell, F. E.....[*Traps.*]
Van Wagoner & Williams Hardware Co...
.....[*Spring Hinges.*]

Toledo.
Toney Water-heater & Mfg. Co.....[*Automatic Water-heater.*].....

PENNSYLVANIA.

Ambler.
Keasbey & Mattison Co..[*Magnesia Covering.*]

Bangor.
Bangor Roofing Slate Mfrs. Assn.....[*Roofing Slate.*].....

Easton.
Bangor Excelsior Slate Co....[*Roofing Slate.*]

Harrisburg.
Harrisburg Fn'dy & Machine W'ks .[*Engines.*]

Philadelphia.
Belmont Iron Works.....[*Ironwork.*]
French & Co., Samuel H.....[*Mortar Colors.*]
Haines, Jones & Cadbury Co...[*Plumber's Supplies.*].....
Hall & Co., Edwin.....[*Cement.*]
Jarden Brick Co.....[*Bricks.*]
Manning, W. T..... .....[*Filters.*]
Merchant & Co.....[*Tin Roofing.*]
Morse, Williams & Co.....[*Elevators.*]
Phœnix Iron Co..... .....[*Structural Iron.*]
Taylor Co., N. & G.....[*Tin.*]
Thorn, J. S. Co.....[*Sheet Metal.*]
Thorn Shingle & Ornament Co.....[*Metallic Shingles.*].....

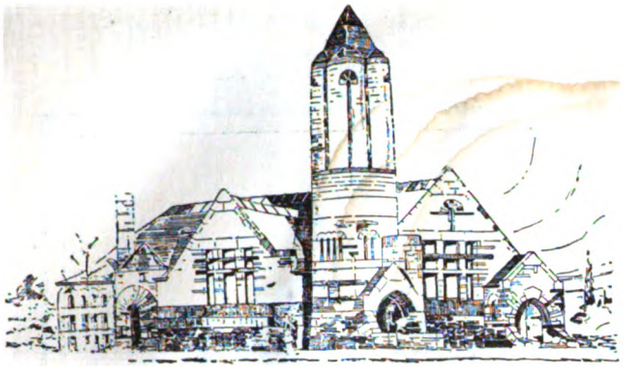
Pittsburgh.
Apollo Iron and Steel Co...[*Galvanized Iron.*]
Follansbee Bros. Co.....[*Roofing Materials.*]
Miller Co., W. Gordon.....[*Trays.*]
Northrop & Co., A.....[*Metal Ceiling.*]
Pittsburgh Terra-Cotta Lumber Co.....[*Fireproofing.*].....

Scranton.
International Correspondence Schools, The [*Architecture.*].....

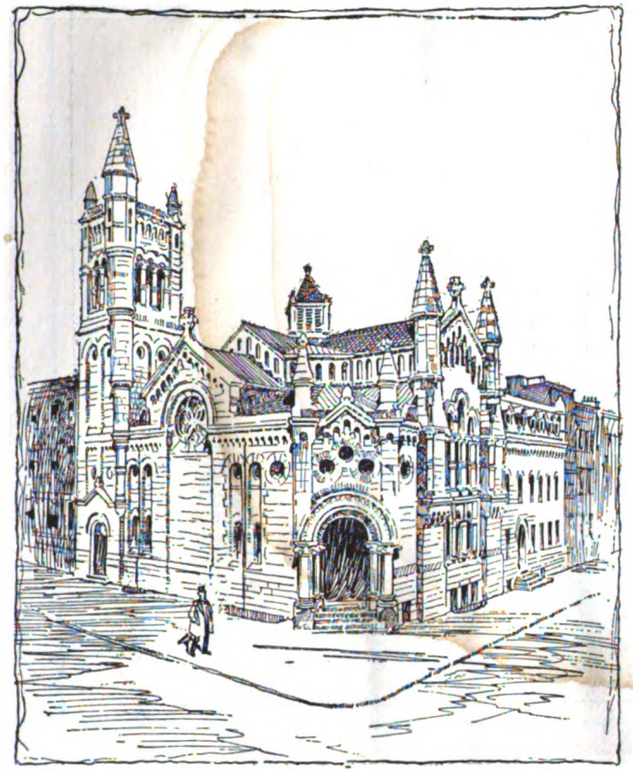
GERMANY.

Ludwigsburg.
Mack, A. & O..... .[*Patent Rights.*]

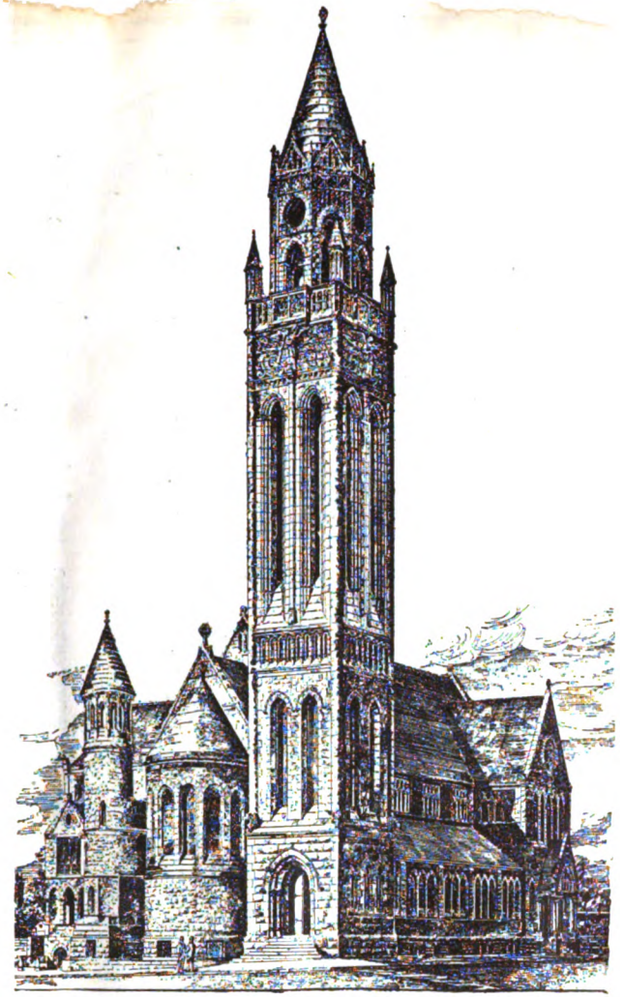
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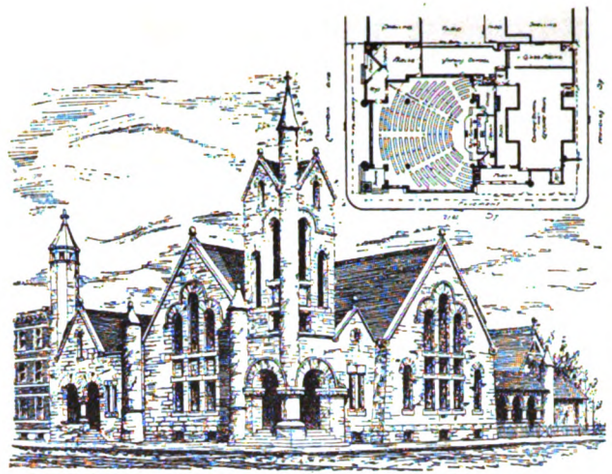
M. E. Church, Cedar Falls, Ia.



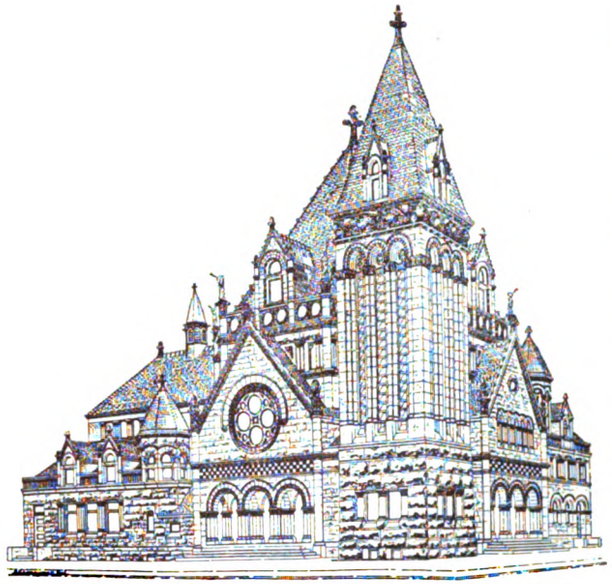
First M. E. Church, Brooklyn, N. Y.



St. James Episcopal Church, New York, N. Y.



Columbia Avenue Presbyterian Church, Philadelphia, Pa.



Design for First Baptist Church, New York, N. Y.

URBAN CHURCHES.

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"LICHEN GRAY,"

A NEW SHADE IN

CABOT'S CREOSOTE SHINGLE STAIN.

A Soft, rock-gray with a delicate greenish cast which gives admirably the color effect of a lichen-grown bowlder.

A particularly appropriate and harmonious tone for country houses. It is known as

No. 1174 SPECIAL.

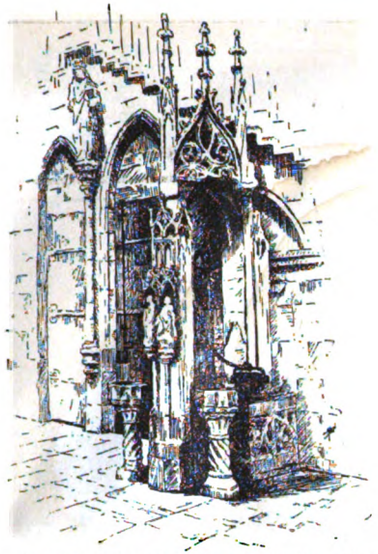
SAMPLES ON APPLICATION.

SAMUEL CABOT, Sole Manufacturer,

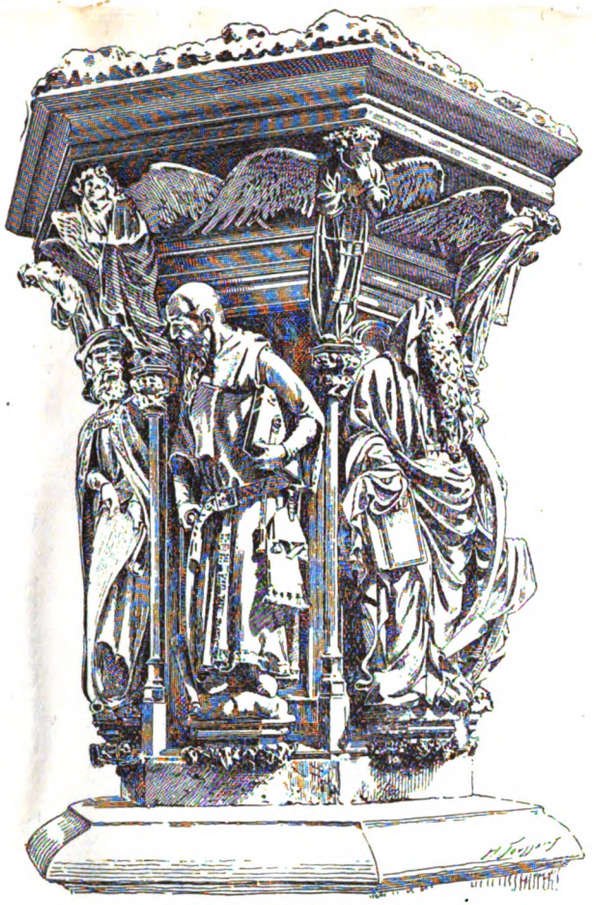
BOSTON, MASS.

Agents at all Central Points.

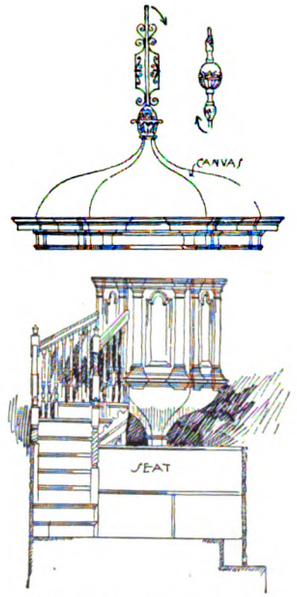
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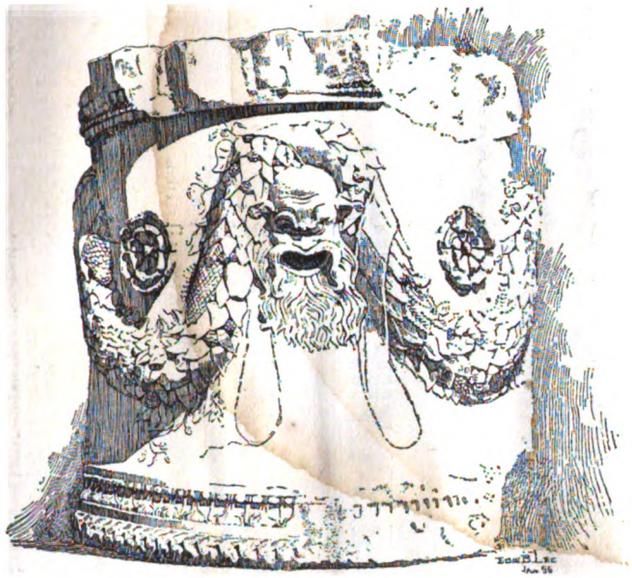
Draw-well, Cathedral of St. Peter, Regensburg, Germany.



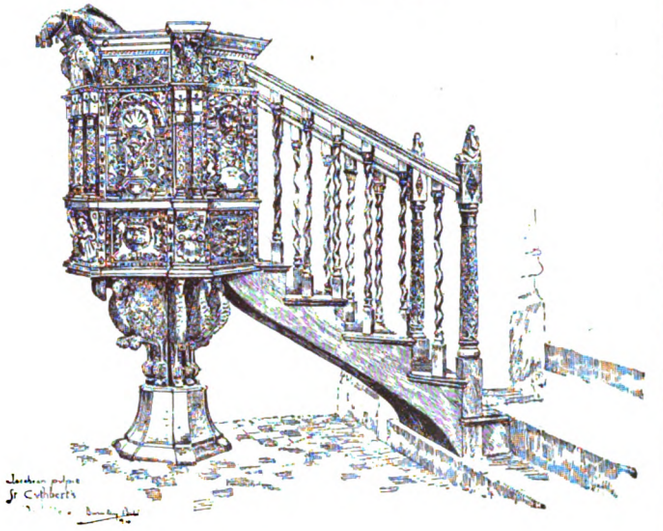
The Well of Moses, Dijon, France.



In King's Chapel, Boston, Mass.



Greek Altar, Theatre of Dionysos, Athens.



In St. Cuthbert's, Wells, England.

PULPITS, ETC.

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POTSDAM RED SANDSTONE....

An architect who has used our stone for a number of fine buildings in the past year or two, said that he did so because, "It is better to use the best building-stone at a fair price than poor material for nothing."

But the argument that Potsdam stone costs so much is being overcome. Improved facilities are making reduced cost possible, and alternative specifications which include other good stones with ours, much more often result in our favor than they used to.

Of course, mahogany costs more than hemlock and always will, but when it is a question of mahogany, cherry or oak, the matter of appearance can be given due weight.

WE ARE IN THE MARKET

to sell POTSDAM RED SANDSTONE, and we are selling it. Its qualities and appearance are pretty well known to architects; — that it can be had at competitive prices is not so well known and this is what we are anxious to prove. Will you not give us the opportunity?

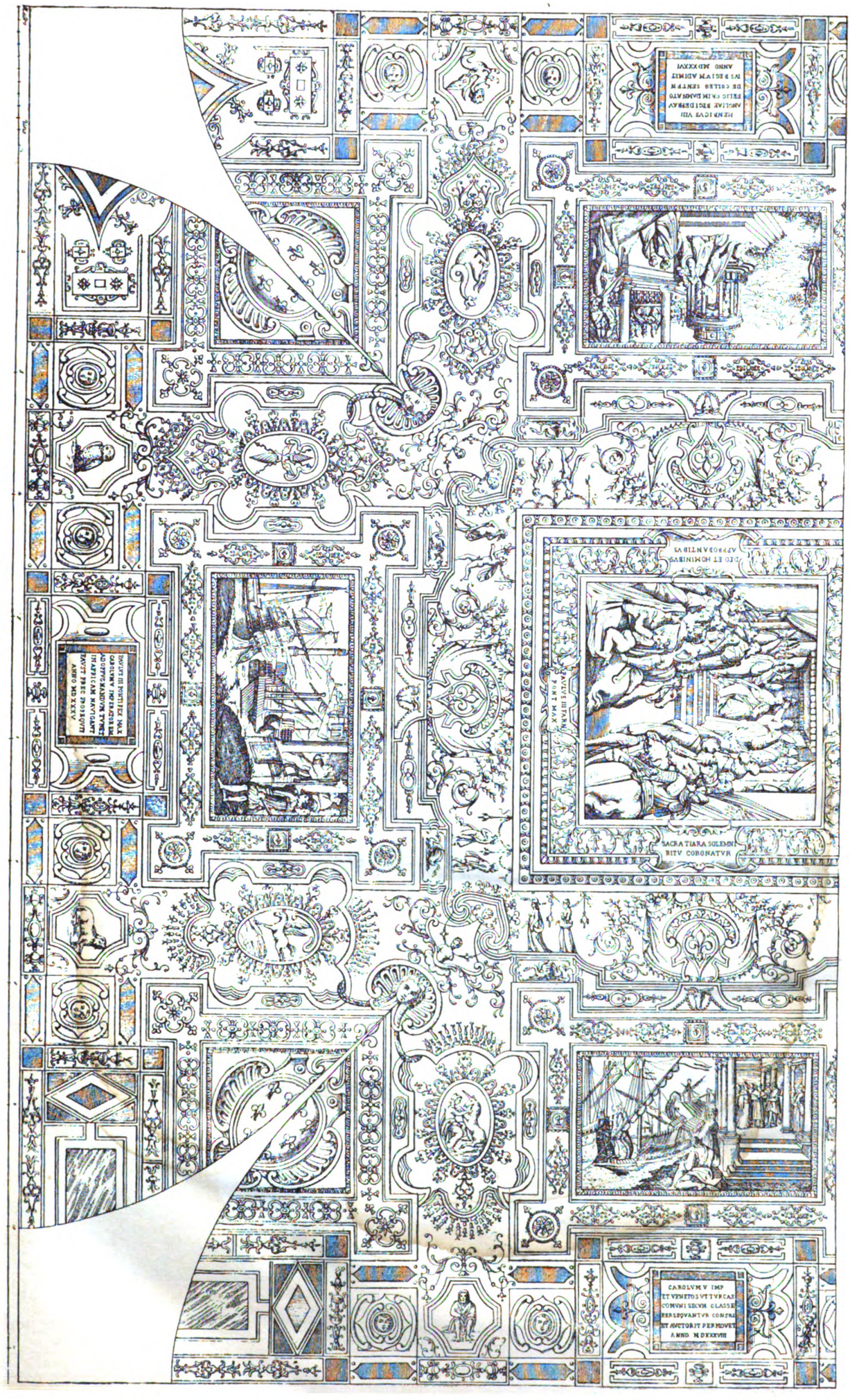
If you will send us a set of plans for an estimate, you cannot confer a greater favor, because we always get a certain proportion of those we figure. Drawings returned same day they are received.

Address all communications to

The Potsdam Red Sandstone Co.

POTSDAM, N. Y.

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Palazzo Farnese, Caprarola, Italy: Portion of Painted Ceiling in the Hall of Council.

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The Heliotype Printing Co.

LITHOGRAPHERS, ETC.

211 Tremont Street
Boston

FAC-SIMILE REPRODUCTIONS IN COLOR
OR MONOCHROME A SPECIALTY



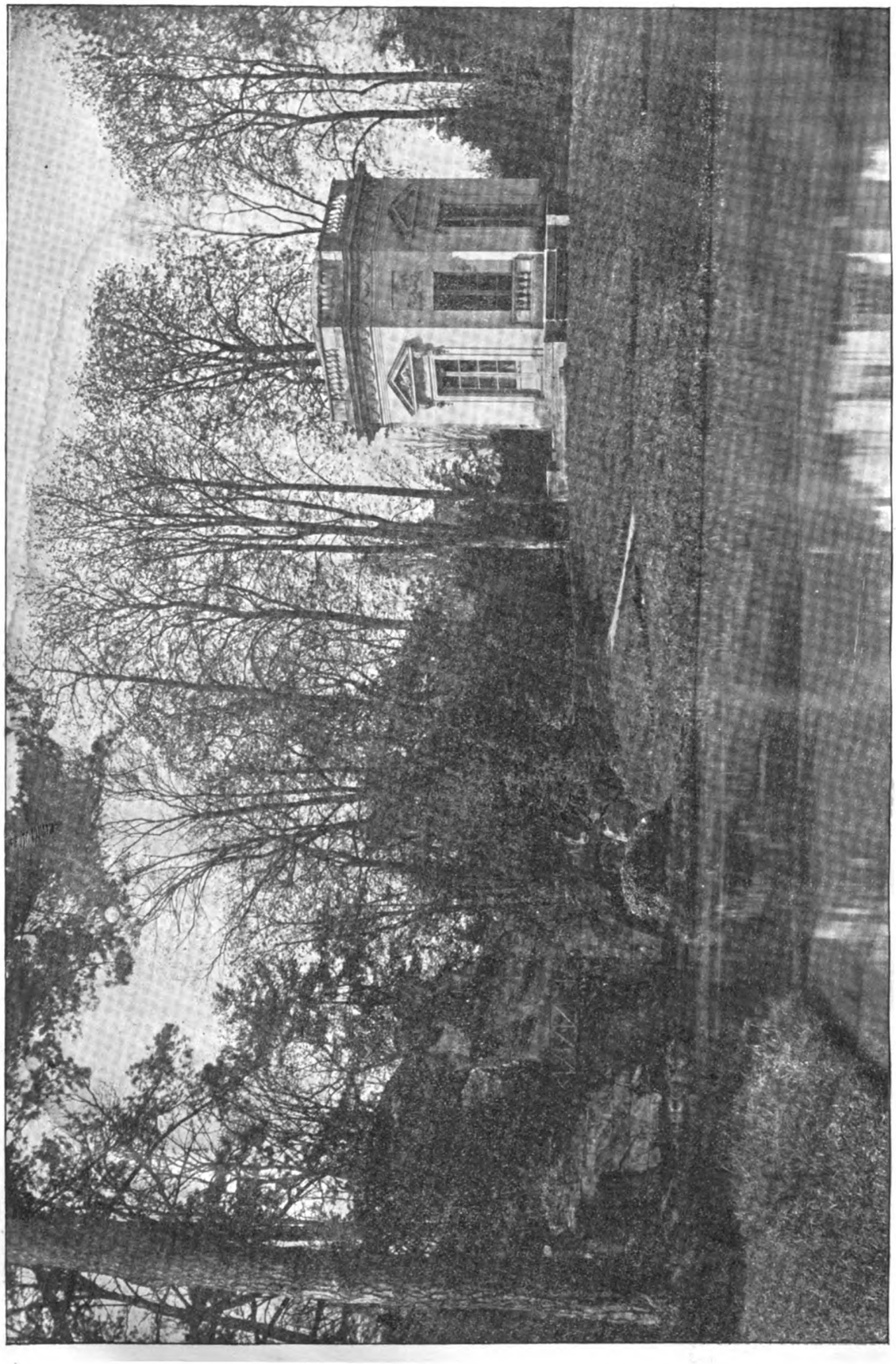
Lithography
Heliotype
Color Printing
Photogravure
Maps, Plans, etc.

BEST WORK ONLY
PROMPT DELIVERY
REASONABLE PRICES

WRITE FOR ESTIMATES

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXVIII.



MUSIC PAVILION IN THE PARK OF THE PETIT TRIANON, VERSAILLES, FRANCE.

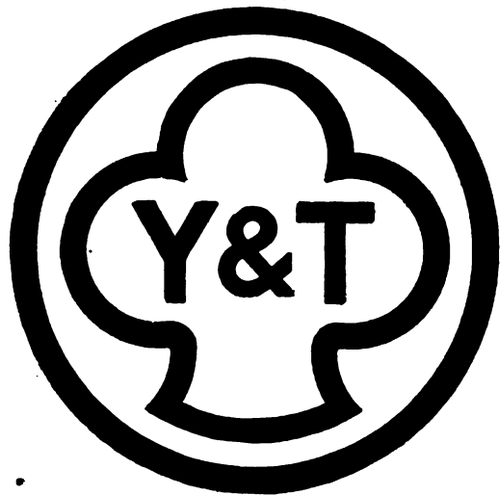
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The Yale Locks,

Builders' Hardware,

Art Metal Work.

All Genuine Yale Trefoil



Hardware bears this Trademark.

The Yale & Towne Manufacturing Co.

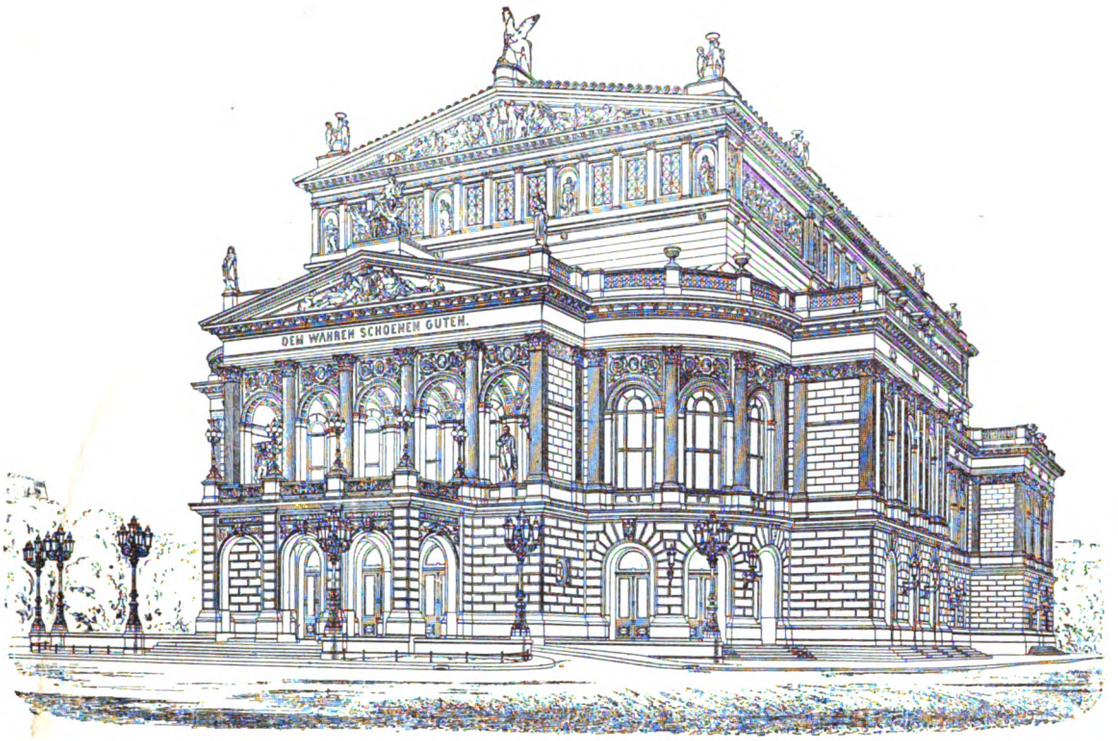
General Offices:
84-86 Chambers St., New York.

Western Office:
152-154 Wabash Ave., Chicago.

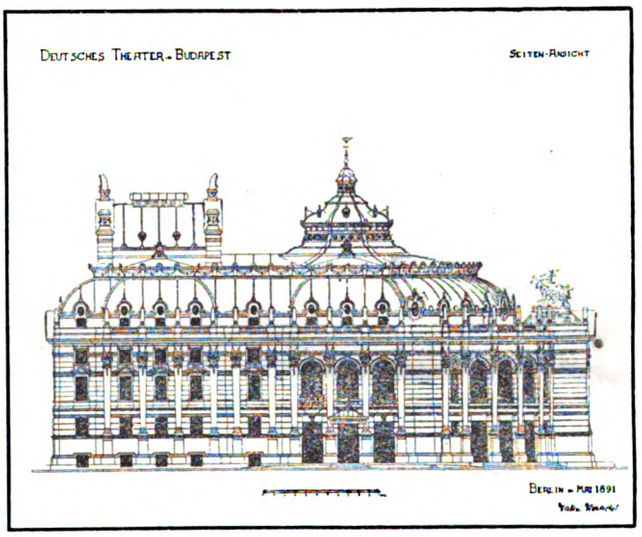
Local Offices:
Philadelphia, Boston, Buffalo and San Francisco.

Works: Stamford, Conn., Branford, Conn.

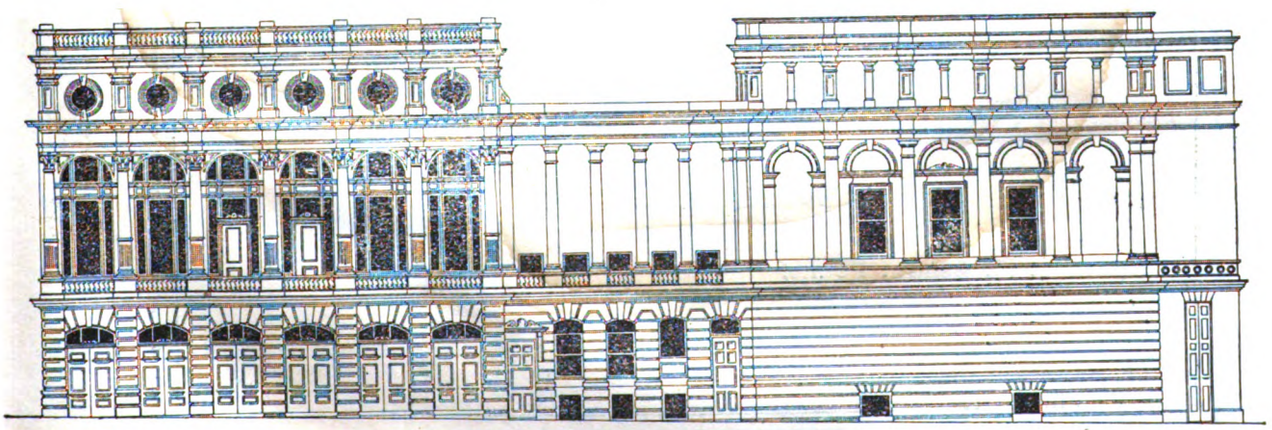
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Opera-House, Frankfort-on-the-Main, Germany.



German Theatre, Buda-Pesth, Hungary.



Garrick Theatre, London, England.

THEATRES.

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"LICHEN GRAY,"

A NEW SHADE IN

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A Soft, rock-gray with a delicate greenish cast which gives admirably the color effect of a lichen-grown bowlder.

A particularly appropriate and harmonious tone for country houses. It is known as

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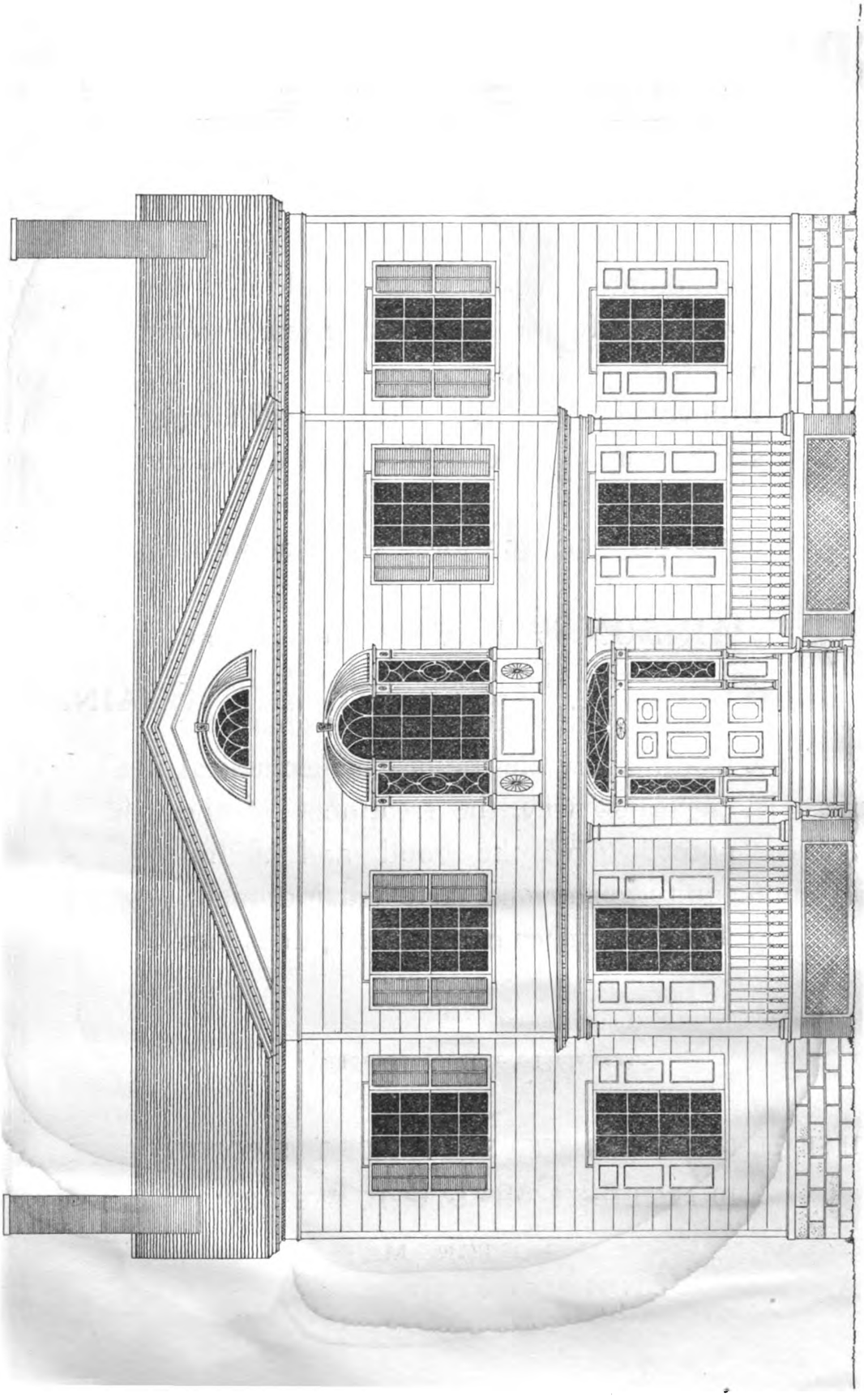
SAMPLES ON APPLICATION.

SAMUEL CABOT, Sole Manufacturer,

BOSTON, MASS.

Agents at all Central Points.

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OLD COLONIAL HOUSE ON LONG ISLAND

DRAWN BY E.B. NOLAN. 1876.

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POTSDAM RED SANDSTONE....

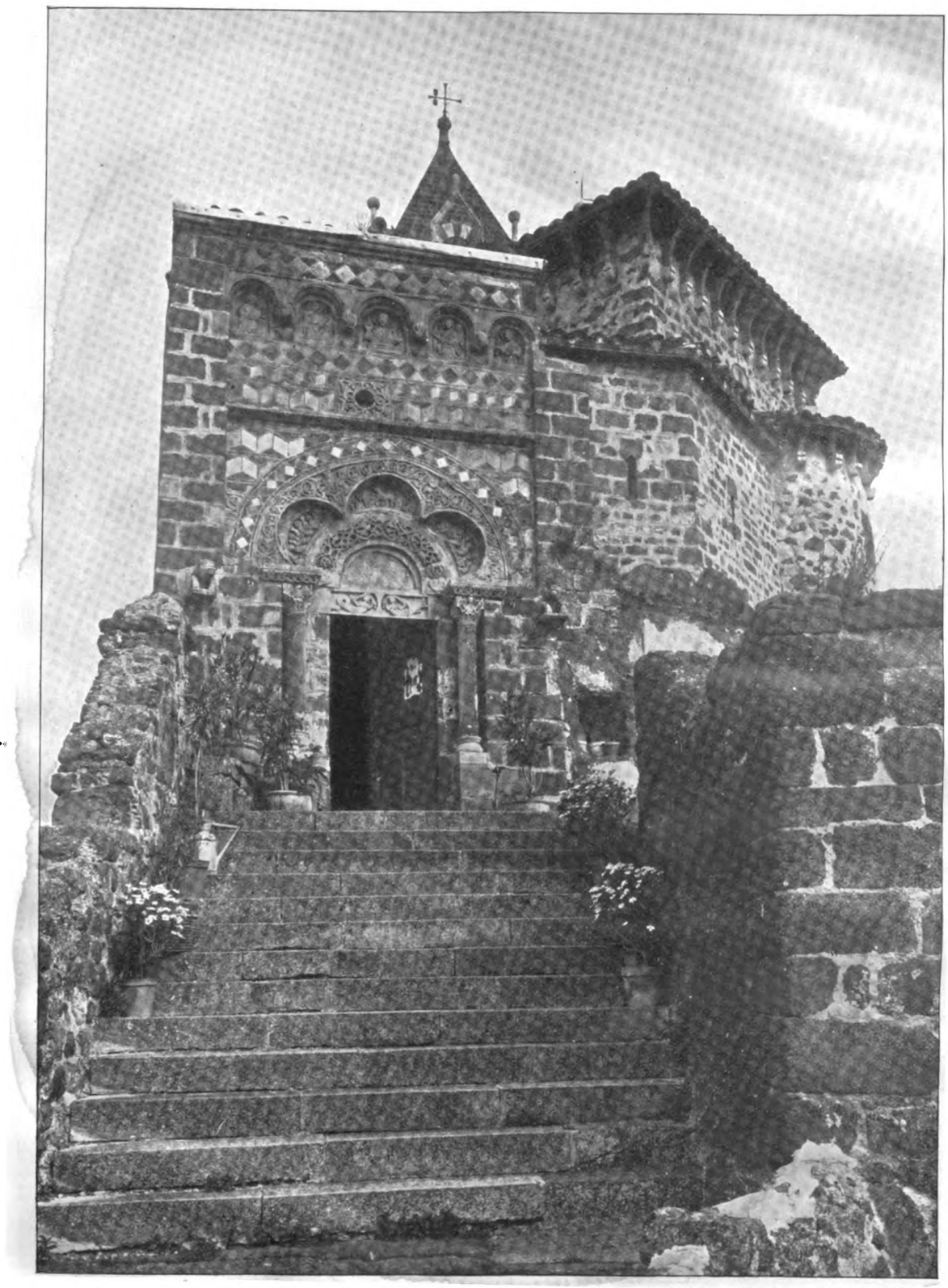
A FINISH for this stone which is rapidly attaining popularity, and for some very important buildings, is hand-pointed work. For mouldings and flat surfaces it gives a life and force to the work, which many leading architects prefer to hammering. Particularly in contrast with rockfaced work, used for wall facings, is this finish satisfactory. It lends itself to complicated mouldings, and for entrance arches and jambs it is effective and quite different from the usual smooth hammering.

A FAIR COMPARISON is the work done by an artistic architectural carver to the product of a "Gravestone artist." The first has life and shows the character and feeling of the workman, while the last is mechanical and tiresome. In the same way, the treatment of the stone with the "point" gives the good and skilful mechanic an opportunity to show his taste and judgment, which hammering, from its mechanical effect, does not allow.

WE SHALL BE GLAD TO SEND SAMPLES OF THIS POINTED WORK TO ARCHITECTS WHO CARE TO SEE THEM.

The Potsdam Red Sandstone Co.
POTSDAM, N. Y.

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Entrance to St. Michel de l' Aiguilhe,
le puy, haute loire, france.

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The Yale & Towne Mfg. Co.



Ornamentation—Marengo.
School—Empire.
Size: 19 x 2½ inches.

The Yale Locks
Builders' Hardware
Art Metal Work

All Genuine Yale Hardware bears this Trefoil Trademark.

Y&T

Hardware of Ornament in great variety and in all schools. Architects' Designs skillfully rendered.

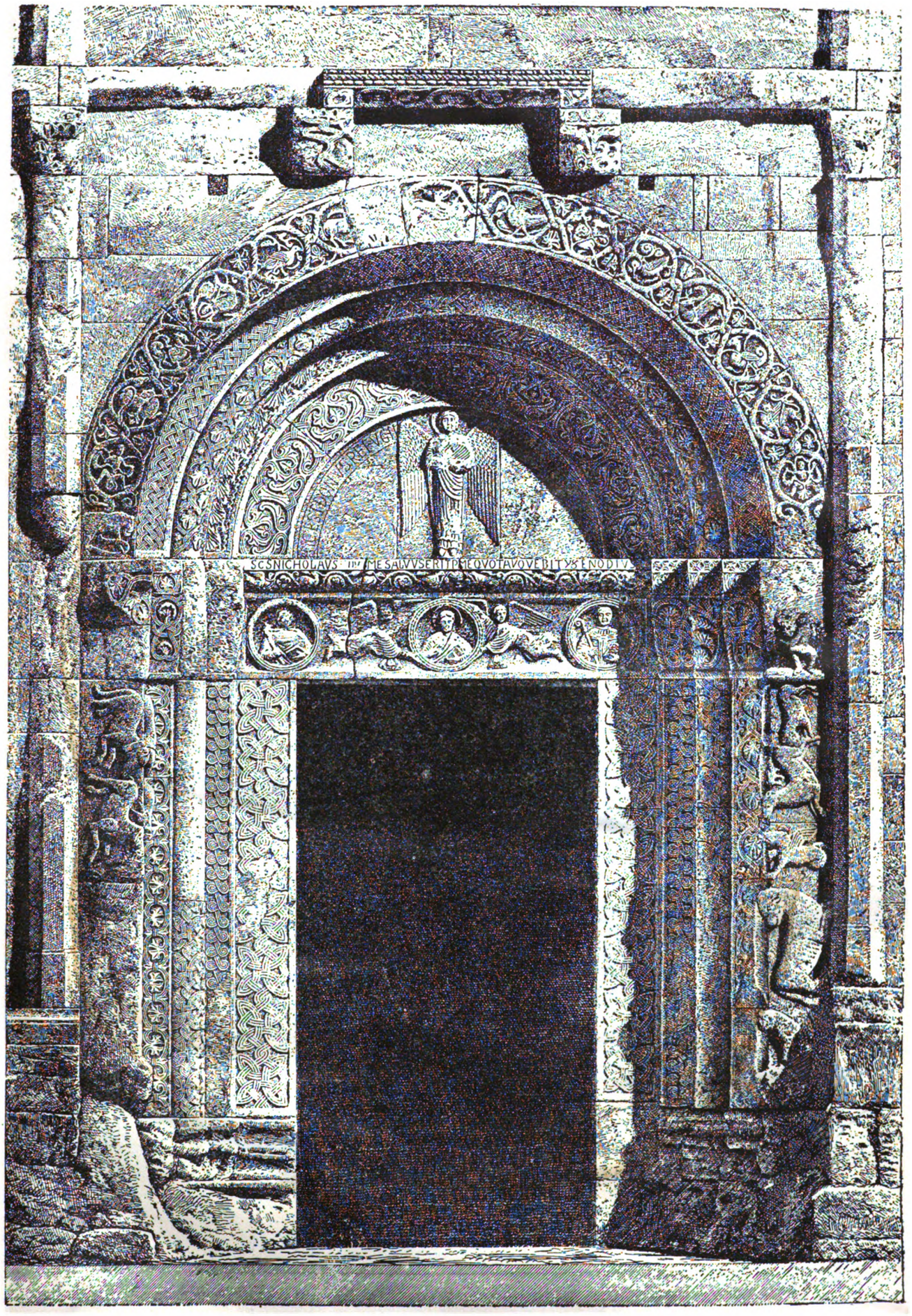
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84-86 Chambers St., New York.

WESTERN OFFICE:
152-154 Wabash Ave., Chicago.

Local Offices:
Philadelphia, Boston, Buffalo and San Francisco.

WORKS: Stamford, Conn., Branford, Conn.

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Doorway of North Transept of San Michele, Pavia, Italy.

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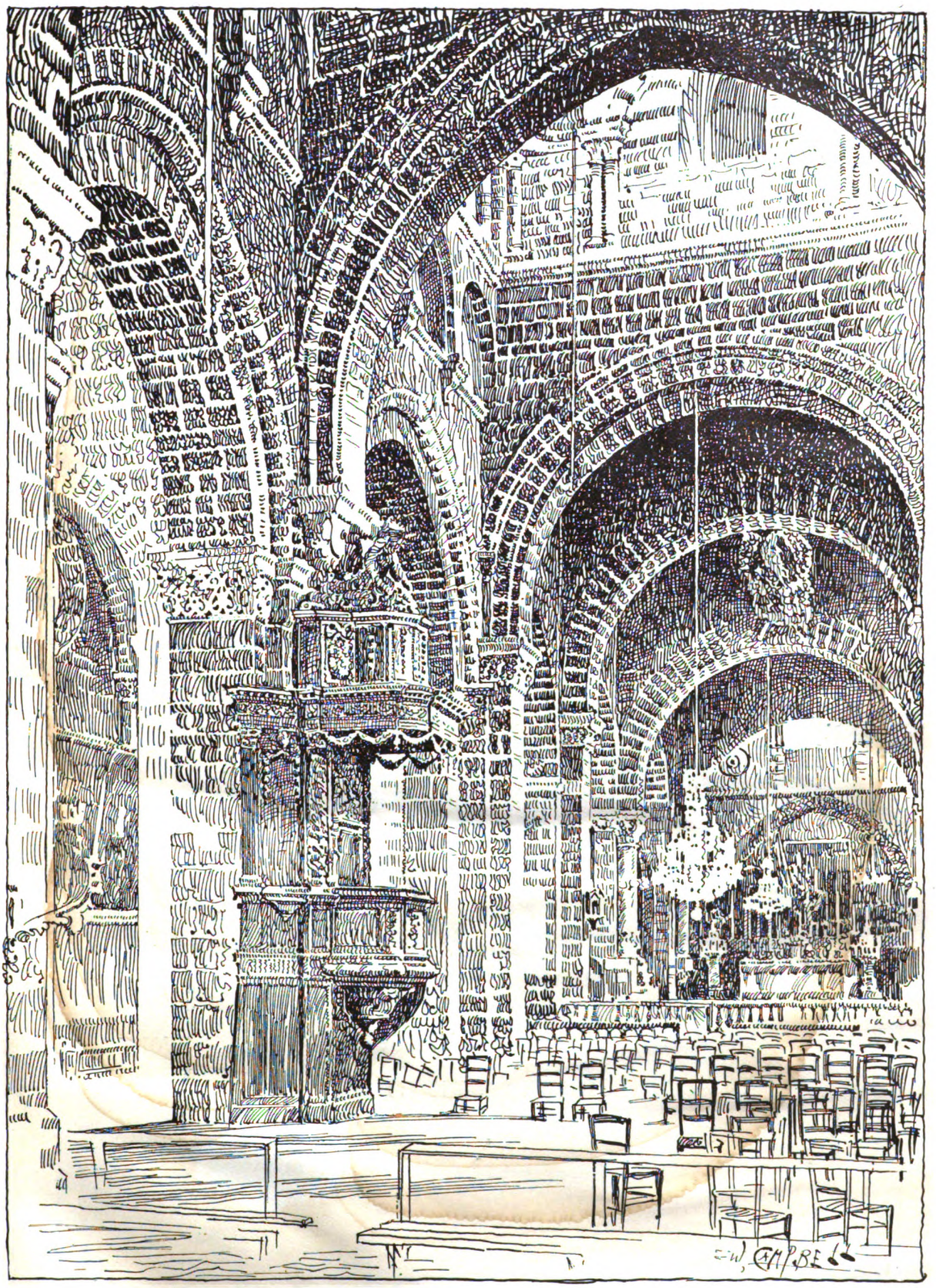
SAMPLES ON APPLICATION.

SAMUEL CABOT, Sole Manufacturer,

BOSTON, MASS.

Agents at all Central Points.

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Interior of the Cathedral of Notre Dame,
Le Puy, Haute Loire, France.

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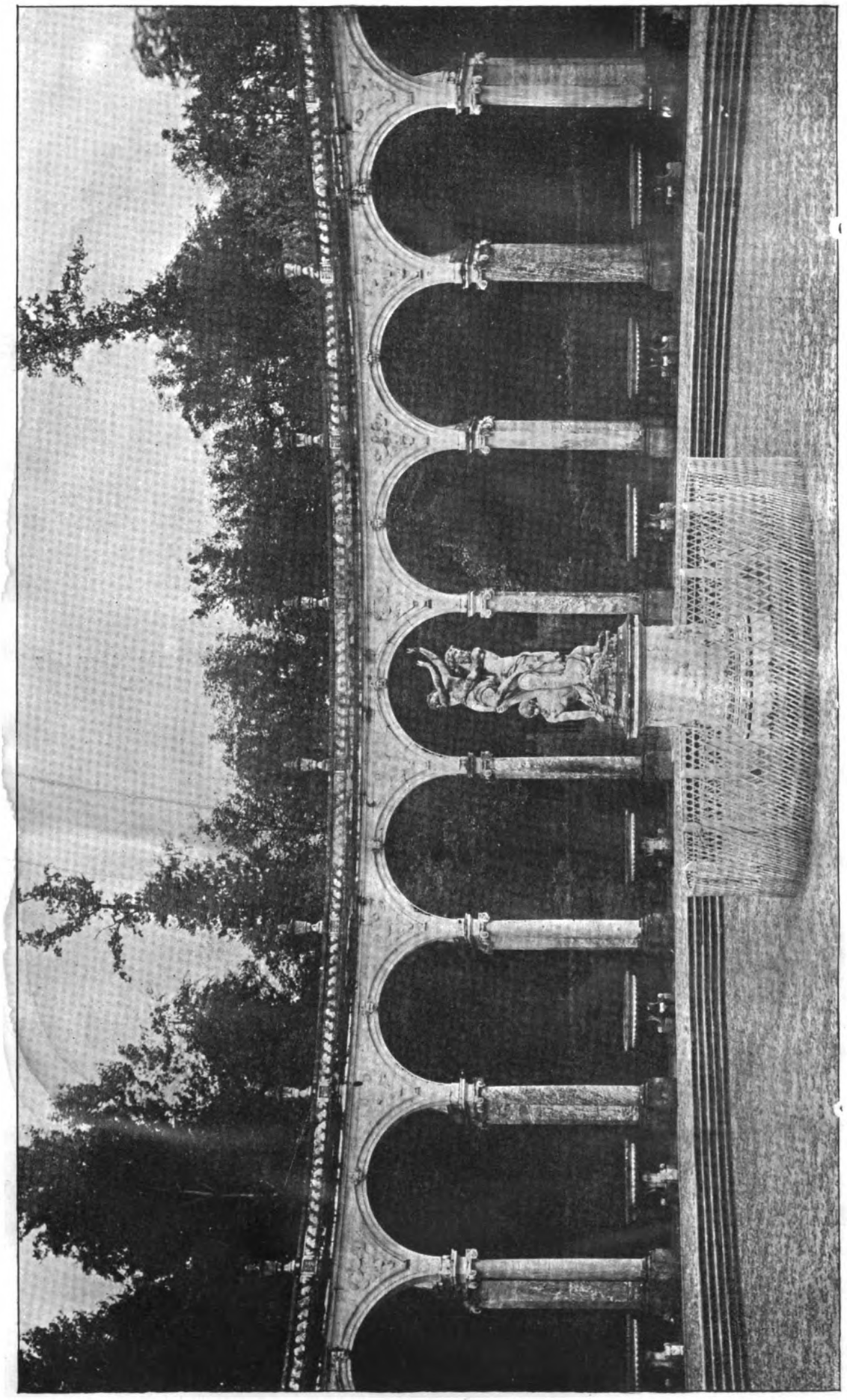
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The Potsdam Red Sandstone Co.
POTSDAM, N. Y.

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXIX.



THE COLONNADE: PARK OF VERSAILLES, FRANCE.

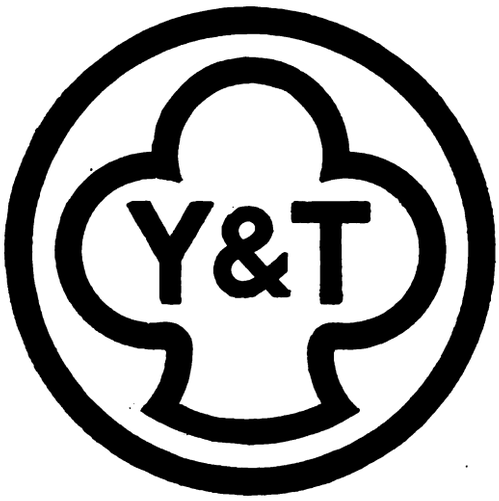
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The Yale Locks,

Builders' Hardware,

Art Metal Work.

All Genuine Yale Trefoil



Hardware bears this Trademark.

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Works: Stamford, Conn., Branford, Conn.

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DOLPHINS.

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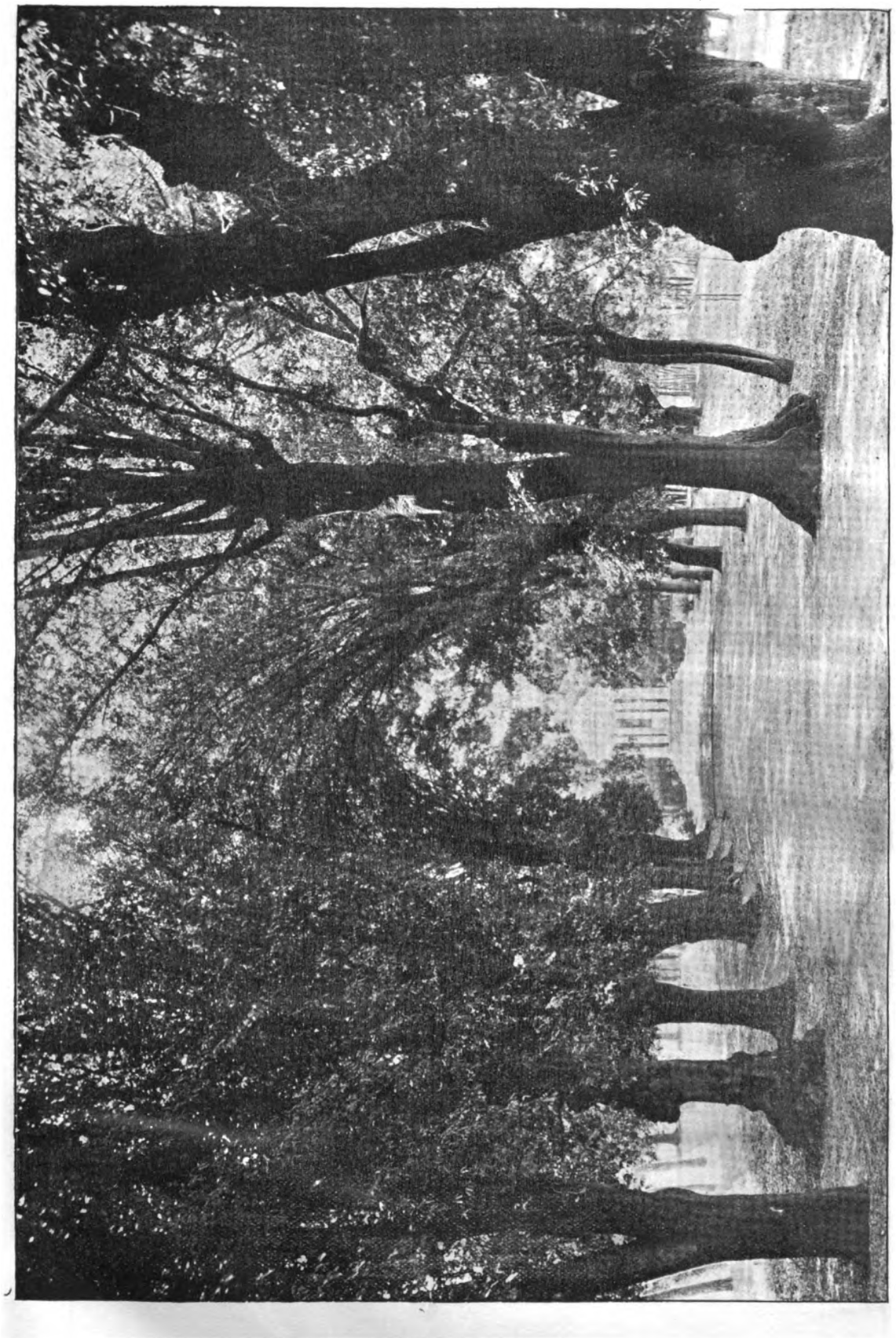
SAMUEL CABOT, Sole Manufacturer,

BOSTON, MASS.

Agents at all Central Points.

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXX.



A Wooded Walk in the Garden of the Villa Borghese, Rome, Italy.

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POTSDAM RED SANDSTONE * * *

Messrs. Yost & Packard, the eminent architects, of Columbus, Ohio, writing us under date of 9th inst. say: "Replying to yours of the 7th, would say, the building you refer to has so little stonework, and is of such cheap character that we could not use your material in it. We would say however, in this connection, that there is no material that has been brought to our notice for which we have as great respect as for your red sandstone, and as soon as opportunity offers we shall certainly avail ourselves of it."

Such unsolicited statements are naturally highly appreciated by us.

The Potsdam Red Sandstone Co.
POTSDAM, N. Y.

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THE AMERICAN ARCHITECT AND BUILDING NEWS



VOL. LIV

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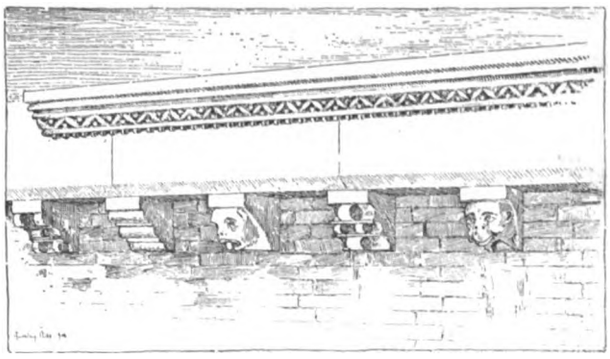
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THE Convention of the American Institute of Architects, which meets in Nashville, Tennessee, October 20, will have brought before it an amendment to the By-Laws, under which Fellows of the Institute, who have been in good standing for ten years, and have been compelled to retire from the active practice of Architecture by reason of physical disability, may retain their membership, provided they do not engage in any other profession or business, and shall be exempt from the payment of dues; thus extending to persons who retire from practice on account of disability the same privileges now enjoyed by members who have attained the age of seventy years. It may be questioned whether a person who had retired from the profession at an earlier age than seventy would be able to vote so intelligently, perhaps for a long series of years, on matters relating to the profession, as the veterans placed on the exempted list by reason of age simply; but the class of architects who will leave the profession in middle life on account of ill-health, and will be able to support themselves without engaging in any other profession or business, is never likely to be a large one, and the element of what we might call architects *emeriti* in the Institute would be by no means without its usefulness.

THE superiority of the Americans in the practice of heating and ventilating buildings is nowhere better indicated than in the criticisms which are devoted, in the foreign journals, to American books on the subject. Even the *Builder*, to the editor of which very few details of the science of construction are unfamiliar, reviews Professor Carpenter's new book, and the recent edition of Dr. Billings's standard work, with a sort of intelligent wonder which is rather amusing to the profession in this country. Speaking of the practice which is almost universal in America, of ventilating school-rooms by bringing in the fresh, warm air in the wall opposite the windows, about eight feet from the floor, and removing foul air by an outlet at or near the floor in the same wall, the *Builder* says that "The very obvious condition, at least to an Englishman, of air admitted at the side, near the bottom of the wall, and discharged at the ceiling, does not appear to have been included in the experiments, whilst the deductions are evidently entirely contingent on the admission of the air at a high temperature, as is the usual American practice, and the use of electricity or other non-vitiating sources of artificial light." As to the use of electric-lighting, it is hardly necessary to say that this does not enter into the question, as no American architect would think of using this sort of circulation in a large hall, or a public assembly-room, without fan-power enough to overcome the ascending tendency of air heated by the breath, or by gas. It is for school-rooms and small hospital wards that this system is used here, and considering the thousands of experiments which have been made in such rooms, with inlet and outlet registers placed in every conceivable position in floors, walls and ceilings, it is rather amusing to find that the *Builder* attributes our partiality for the downward system to our ignorance of the advantages of that which consists in bringing in the fresh air near the floor, and exhausting the foul air at the ceiling. American readers hardly need to be told that the result of such a disposition of the inlets and outlets, in rooms of less than a thousand square feet floor area, and not more than thirteen or fourteen feet high, is to establish a current directly from the inlet register in or near the floor to the outlet at the ceiling, through which the fresh, warm air escapes, without much affecting the portions of the room outside its course; and that, after many years of the most careful experimenting, it has been found that, in the rooms of our large school-houses, which are, or should be lighted mainly from one side, the most thorough aëration, with the least liability to injurious draughts, is obtained by introducing the fresh, warm air above the heads of the occupants of the room, on the side opposite the windows, letting it spread along the ceiling to the window side of the room, and there, cooled by contact with the glass, descend to the floor, and pass at the lower level, to the outlet, in the same wall as the inlet, but in or near the floor. There is no doubt that the warm breath of the people in the room to a certain extent rises and mingles with the fresh air flowing across the ceiling, but, notwithstanding this, the atmosphere of the room, as shown by the unanswerable testimony of analyses, made at different times, of the air in the various corners, is more uniformly pure under this system than under any other. The *Builder* probably does not know that the inspectors of the Massachusetts State Police make, every year, hundreds of analyses of this kind of the air in school-rooms occupied by children, and that the results of their analyses are impressed upon the minds of the public and the profession by imperative orders to change any system of ventilation which is not found to give results in accordance with the high standard fixed by the authorities whose duty it is to enforce the law. It is obvious that, in our school-room system, a very important part is played by the large window surface, which, by cooling the air on one side only of the room, produces a rapid circulation of all the air in the room, and without this aid the results might be very different; but the utilization of this potent factor in distributing the fresh air evenly in school-rooms certainly does not indicate that the American architects have adopted their present practice only because they had never heard of any other.

AS to the observations that "An American likes to breathe air at 70 degrees Fahrenheit, or even at 90 degrees," and that this may account for the American preference for putting the warm-air registers in school-rooms eight feet from the floor, instead of at the floor line, it would be interesting to know whether an English architect would think it advisable to bring fifteen hundred cubic feet of air per minute, at a temperature below 70°, through a register near the floor, into a school-room occupied by fifty children. American practice would require the air coming at such a velocity, through a register so placed that the direct current could come in contact with any person, to be warmed to 110°, at least, in order that those exposed to it might not suffer from cold, due to the chilling effect of the rapid evaporation from the skin caused by such a draught; and it is partly with the object of permitting currents of comparatively low temperature to be used that the inlet registers in school-rooms are now always placed far above the children's heads. In theatres and public halls, as the *Builder* mentions, but, apparently without understanding the reason, our architects generally subdivide the inlets or outlets, or both, into a very large number of small openings, so that fresh air, at a moderate temperature, can be conveyed directly to each seat, but in such restricted quantity that no one is exposed to a strong draught. Whether these individual registers shall be inlets or outlets depends upon the judgment of the architect or engineer. Both are used successfully.

HERR MORITZ KADISCH concludes, in the *Oesterreiche Monatschrift für öffentlichen Baudienst*, his study of the Workingmen's Colonies which have become so important a feature of public charity in Germany. These colonies receive applicants for food and shelter, put them at such work as they can do, and feed and house them comfortably, subjecting

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them, however, to strict, though wholesome discipline; and the particulars of the character and antecedents of the applicants for such relief, and the way in which they submit to the conditions upon which it is furnished, are extremely interesting. At the Berlin Colony, with its sub-colony, eight hundred and sixty-five persons were cared for last year, and this seems to be about the average number. As the system is, to a great extent, the work of the Evangelical Church, it is not surprising to find that seven hundred and seventeen of the persons relieved professed the Evangelical creed; one hundred and forty-one were Catholics; six Jews, and one is classed as a "Heathen." Three hundred and eleven were under thirty years of age; two hundred and fifty-four were between thirty and forty; two hundred and eighty-nine were between forty and fifty, and only eleven were over fifty. About half the total number were mechanics, and one-fourth laborers. The rest were of various professions. Twenty of them were teachers; fifteen were civil engineers; ten were artists; ten more were theological students; fifteen were apothecaries; one was a lieutenant in the army; another was a minister; three were actors; one was a physician, and one a Doctor of Philosophy. All these poor people were given work on probation. Twenty-three of them were sent away for drunkenness; forty-eight for laziness, and eighty-four for insubordination. Three hundred and ninety-one were discharged at their own wish, and one hundred and ninety-two found employment outside the institution.

AT Berlin, as in the other similar establishments in Germany, applicants for relief are received, as a rule, only for a short time, four months being the ordinary limit; but some of the people, it appears, who are without friends or family, become so attached to the regular, wholesome and orderly life of the Colony, with its intellectual and spiritual comfort, that they are unwilling to leave it, and these are sometimes allowed to remain for a longer period. In any case, participation in the advantages of the Colony is only retained by the strictest industry and discipline. Every inmate is allotted work within his physical capacity, but sufficiently exacting to demand steady attention. Any one who neglects to do his task, or idles away his time, is summarily excluded; and the same result follows any infraction of good morals. Strict regulations are laid down for the government of the Colony, and the first infraction of these is followed by a warning; the second by expulsion. Those, however, who do their work diligently, and conform to the necessary discipline of the place, are not without their reward. After working-hours, they are free to amuse themselves properly together, and may read the books in a well-stocked library. A certain small sum is charged to them for their maintenance. If they are physically unable to earn this amount, but show willingness, and conduct themselves well, they are not driven away, but all able-bodied inmates are expected to earn enough to pay the regular charge. If any one earns more, he is credited with the surplus, which is paid to him when he is honorably discharged, but which he forfeits if he runs away without permission, or is expelled for any misconduct. In this way the thoughtful Germans, and particularly the clergy, who have been foremost in the work, are trying to combat the fearful evil of mendicancy, and there are many indications that they are beginning to succeed. If they have accomplished no other purpose, the Colonies have, at least, made more clear the distinction between real misfortune and wilful poverty. As in many of our own cities, persons interested are provided with tickets of introduction to the Colonies, which they can give to persons who ask for charity, and who seem to them to be deserving. Many of these tickets are distributed in this way, but it is the universal experience of the Colonies that not one in a hundred is ever presented. In nearly all cases the ticket is immediately thrown away by the recipient, who has no desire to avail himself of any opportunity for getting a living by working. Moreover, the managers of the Colonies find that the habit of professional mendicancy is one which grows with frightful rapidity in persons originally well-meaning. Bishop Potter, of New York, once told an instructive story of a man, a carpenter, as we recollect, who was partly crippled by an accident. He came to the Bishop's father, who knew him, for a letter, by means of which he might obtain temporary assistance from charitable people. Once furnished with this letter, as the Bishop said, he soon became a declared beggar. He was still quite capable of earning a living, but the charm of getting a living without working was more than he could resist, and he devoted his sole attention subsequently to collecting alms by means of his letter. In the same way, the managers of the German Colonies find that people who have been supplied with food or money simply because they asked for it, soon become absolutely incapable of working profitably, or from any other motive than fear. Occasionally men of this sort find their way to a Colony, but the begging habit so quickly destroys all moral force that they have not the strength of will necessary to keep themselves within the bounds of the required discipline. The effort to do so, which to the industrious part of the colonists is easy and pleasant, is to the newcomers an intolerable burden, and they soon allow themselves to be expelled for misconduct, or seize an opportunity to run away, to free themselves from the unendurable atmosphere of usefulness and self-restraint. These people, it is found, prefer a prison to the free Colony, apparently because, in the former, they are driven to their work like cattle, and do not have to force their atrophied moral sense to choose for itself between idleness and industry. It is not surprising that the people most familiar with such matters in Germany, as in England, and in our own country, say in the most emphatic and earnest manner that the deadliest enemy of the poor is the thoughtless giver of alms.

THE Corporation of Liverpool is studying the question of a new building ordinance, and the bold proposition has been made to it, with the endorsement of the Health Committee of the Corporation, that it should be henceforth forbidden to carry any building to a height greater than the width of the street on which it fronts, except by special permission of the Corporation. It is hardly necessary to say that the architects and builders of the city think such a provision unreasonable, and it will undoubtedly be modified; but it may be worth while to consider what will be the probable effect on building of the tendency which is showing itself almost everywhere to limit the height of city buildings in proportion to the width of the streets on which they abut. Obviously, such restrictions will make it necessary for those who wish to build high to seek sites on wide streets. Now it is practically the universal opinion of real-estate agents that narrow streets are better for business than wide ones. Hence, the person who proposes to erect a structure for business purposes must reckon, in the first place, how high he can build in a given locality; and, secondly, whether, if he builds on a wide street, he can find tenants enough to fill a building carried to the limit of height. This problem is already confronting architects and owners in New York, where, although there are no legal restrictions, there is the practical difficulty that the multiplication of lofty buildings on the narrow streets of the lower part of the town, where tenants for offices can most easily be found, tend to darken the streets so much that the lower stories, which bring the highest rents, are made undesirable. In Paris, as we all know, the effect of a restriction somewhat similar to that proposed for Liverpool, but much less severe, has been to scatter business over a wide area, instead of allowing it to concentrate in a single small district; and, on the whole, this is probably a desirable condition for a large city.

IT is a matter of considerable interest to know that a company has been formed in Paris for the purpose of undertaking, by contract or otherwise, constructions of all kinds on the system of mixed metal and concrete. This would not, of itself, be very remarkable, since several firms and corporations do the same sort of work in different parts of the world; but the Paris company is remarkable for the distinction of the persons who administer its affairs. The two engineers are M. de Tedesco, whose name is very familiar to people who have had occasion to study the theory of concrete work; and M. Zschokke; while among the members of the Managing Council are M. Coignet and M. E. Candlot, both of whom bear names renowned in connection with the science of cements and concretes. M. Coignet, with M. Bonna, who is also a director of the company, have turned over to the company all their patents, and they will henceforth contract only in the name of the company. There can be no doubt of the skill and science of the engineers and managers of the new company, and it is much to be hoped that they may succeed in their purpose, of extending in France, as well as in foreign countries, the use of the strong, cheap, incombustible and almost imperishable methods of construction which the new materials and combinations connected with concrete work have placed at our service.

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HISTORY OF THE UNITED STATES CAPITOL.[1]—VII.

THE resignation of Latrobe placed the position of Architect of the Capitol at the disposal of the Commissioner of Public Buildings and Grounds.

President Monroe, who was now in the White House, became acquainted with Charles Bulfinch when on a visit to Boston, July, 1817. On this occasion Bulfinch was Chairman of Selectmen, as well as of the reception-committee which received the President. Miss Ellen S. Bulfinch, in the life[2] of her grandfather, Charles Bulfinch, which was recently published, gives several letters and other data, from which I have taken extracts, throwing light upon this period in the history of the Capitol.

Bulfinch in his brief manuscript autobiography, says "About November, 1817, following the visit of the President, I received a letter from William Lee, Esq., one of the auditors at Washington, and in the confidence of the President, stating the probability of the removal of Mr. Latrobe, the architect of the Capitol, and proposing that I should apply for the place. I declined making any application that might lead to Mr. Latrobe's removal, but, before the end of the year, disagreements between him and the Commissioner became so serious that he determined to resign, and his resignation was immediately accepted. On receiving information of this in another letter from Mr. Lee, I made regular application through J. Q. A. [John Quincy Adams], Secretary of State, and by return of post received notice from him of my appointment, with a salary of $2,500, and expenses paid of removal of family and furniture."

The letter of Mr. Wm. Lee, referred to by Bulfinch, shows that the friction between Latrobe, the Commissioner and the President, was at the point of rupture before September, 1817. He says, "I am sorry for Latrobe, who is an amiable man, possesses genius and a large family, but in addition to the President not being satisfied with him, there is an unaccountable, and I think unjust, prejudice against him by many members of the Government, Senate and Congress."

Bulfinch says that, although he would be pleased to have the situation, "I have always endeavored to avoid unpleasant competition with others, that by opposing their interests would excite enmity and ill will. I should much regret being the instrument of depriving a man of undoubted talents of an employment which places him at the head of his profession."

The President on his return appointed a commission, consisting of General Mason, Mr. Graham and Colonel Bomford, to examine and report upon the state of the Capitol.

Mr. Lee wrote to Bulfinch that either Commissioner Lane or Latrobe must go out, and he thought the Commissioner would be retained as he had more friends than the architect.

The three commissioners reported in favor of retaining Latrobe. Wm. Lee still urged Bulfinch to apply for the place, telling him that with the assistance of his friends he would undoubtedly be appointed. But after the report in favor of Latrobe, Bulfinch declined to make an effort, writing a letter to that effect November 15.

Latrobe's resignation, two days later, left the position open. Bulfinch's friends, Wm. Lee, H. G. Otis and J. Q. Adams, urged the appointment of Bulfinch. Monroe said to Mr. Otis, "Sir, we are looking to him [Bulfinch], but Mr. Latrobe is a great loss and it will require two persons to supply his place, and we think also of a Mr. Macomb [architect of the City-hall, New York]." Several letters passed between Bulfinch and his friends bearing upon the salary, expenses, climate of Washington, etc.

He was tendered the position at $2,500 per annum, and in addition to his salary and travelling expenses, he was allowed $500 a year for a draughtsman.

Through John Quincy Adams, Bulfinch informed the authorities that he would not be able to remove to Washington before January, 1818.

His official appointment was made out January, 1818.

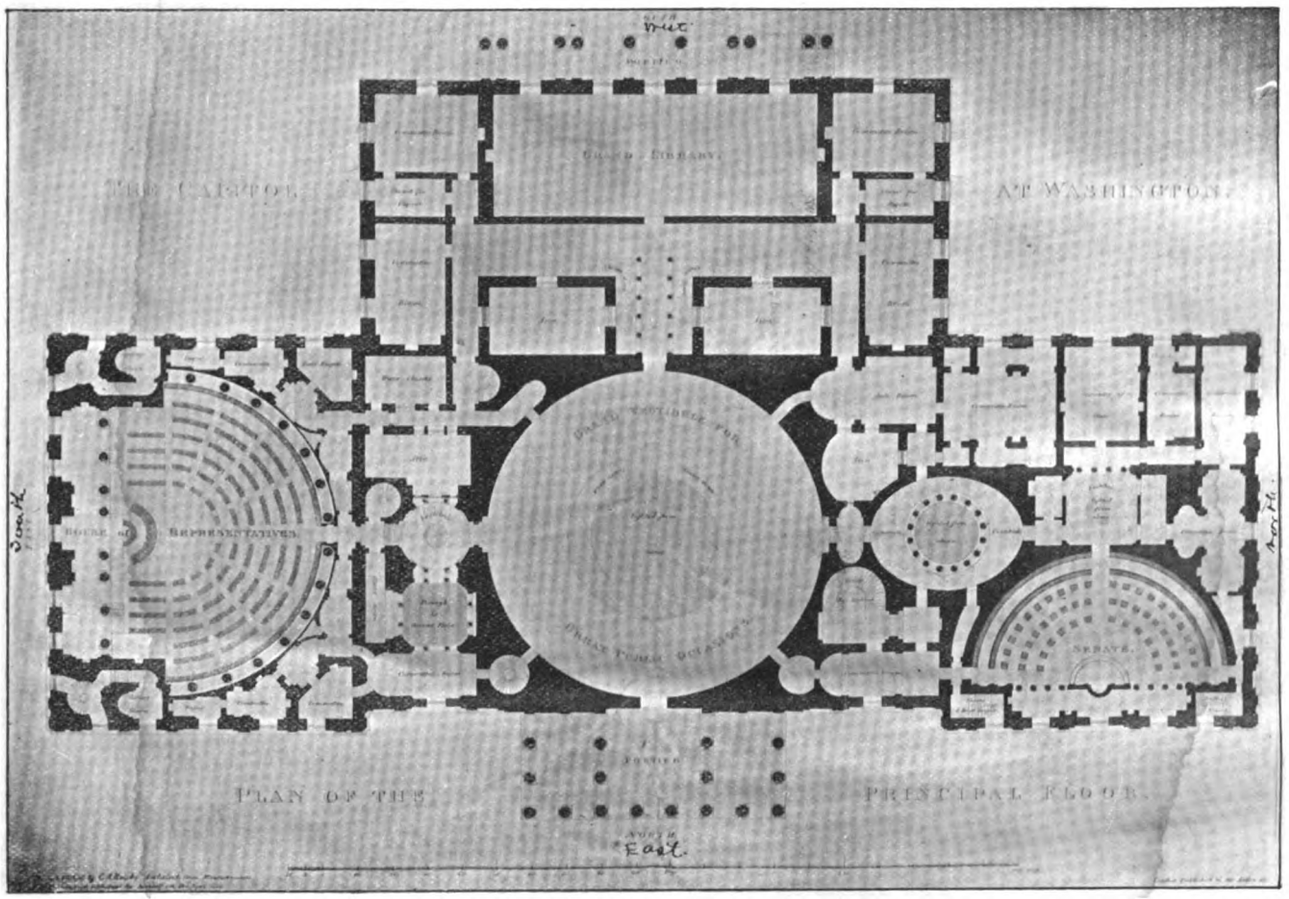


Fig. 47. Plan made by C. A. Busby, Architect, from measurements and drawings obtained on the spot, 1819, presumptively showing Bulfinch's Changes on West Front and Alteration of East Front.

TO CHARLES BULFINCH, ESQ.:—

Sir,—Having entire confidence in your professional talents and integrity, I have appointed you Architect of the Capitol of the United States, to discharge all the duties and to receive the emoluments attached to this appointment.

Your salary to commence the 11th day of December, last past.

Given under my hand at the City of Washington, the 8th day of January, 1818.

SAMUEL LANE, *Commissioner of Public Buildings.*

A letter of Bulfinch's, in his granddaughter's book, gives an interesting description of his feelings and what he found upon taking possession of his office: "I have received from Colonel Lane a great number of drawings, exhibiting the work already done, and other parts proposed but not decided upon.

"At the first view of these drawings, my courage almost failed me—they are beautifully executed, and the design is in the boldest style. After longer study I feel better satisfied and more confidence in meeting public expectation. There are certainly faults enough in Latrobe's designs to justify the opposition to him. His style is

[1] All rights reserved. Continued from No. 1080, page 78.

[2] "*Life and Letters of Charles Bulfinch, Architect*," by Ellen S. Bulfinch: 1896.

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calculated for display in the greater parts, but I think his staircases in general are crowded, and not easy of access, and the passages are intricate and dark. Indeed, the whole interior, except the two great rooms, has a sombre appearance. I feel the responsibility resting on me, and should have no resolution to proceed if the work was not so far commenced as to make it necessary to follow the plans already prepared for the wings; as to the centre building, a general conformity to the other parts must be maintained. I shall not have credit for invention, but must be content to follow in the prescribed path; as my employers have experienced so much uneasiness of late, they are disposed to view me and my efforts with complacency."

The first report Bulfinch made gives a clear statement of the condition of the work when he took charge, as he had spent his time between arrival and writing his report in viewing the building and studying the original plans and designs for the work.

"Great progress has been made towards rebuilding the north and south wings. It will be necessary to complete them according to the designs already adopted and on the foundations already made.

"I have been engaged in preparing several designs for the central portion, from which the President may choose one."

It is strange that none of Bulfinch's drawings of the Capitol have been preserved.

C. A. Busby,[1] an English architect, made drawings in 1819 (a short time after Latrobe retired) and published them in 1822, from measurements and drawings obtained on the spot.

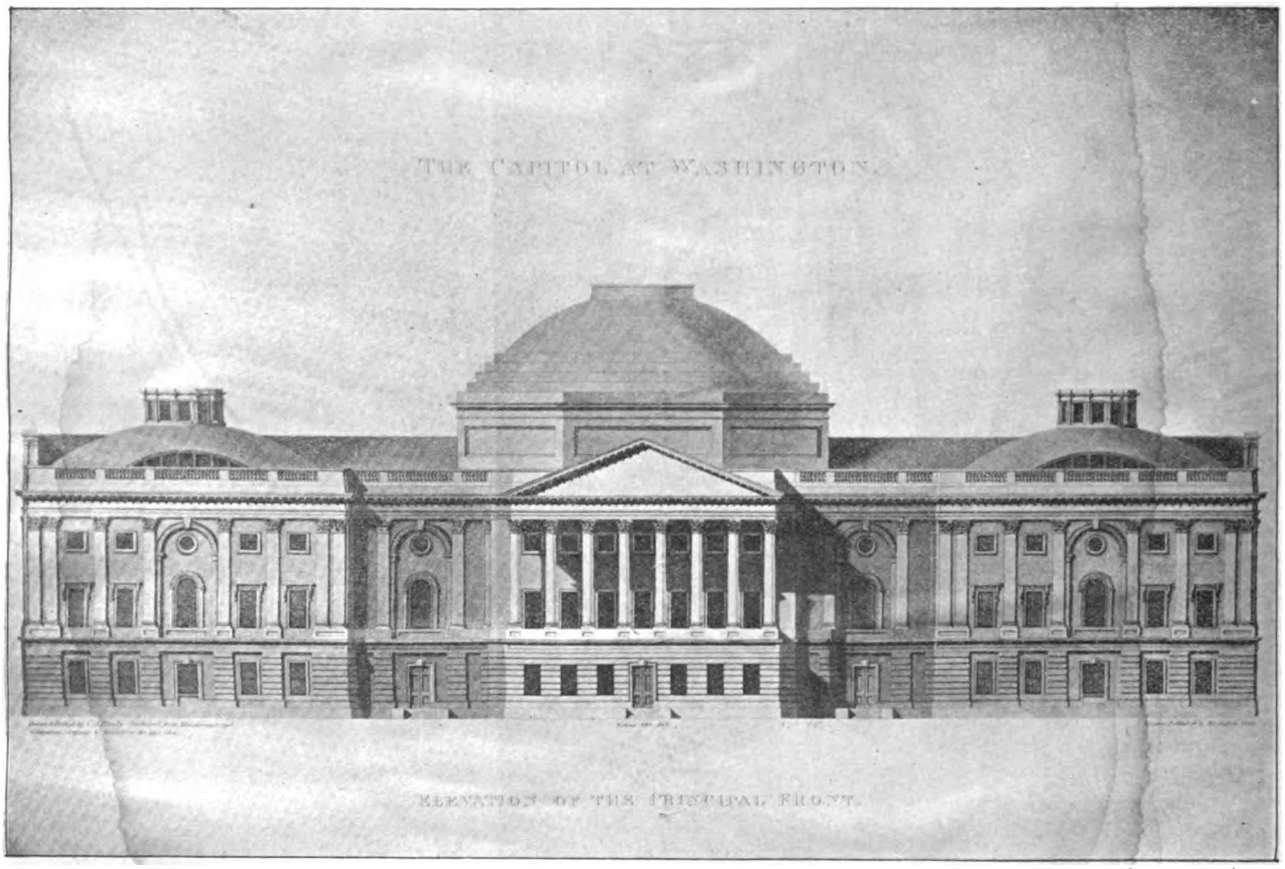


Fig. 48. Elevation made in 1819, by C. A. Busby, from data obtained on the spot, probably showing Bulfinch's Design.

As this elevation and plan show a different treatment from the ones of Latrobe's, we can assume that they present one of the designs made by Bulfinch. The plan and elevation have been carefully executed, although the points of the compass have been transposed on the original engraving (Figs. 47 and 48). This plan shows a circular opening and stairway in rotunda from the principal story to the crypt or basement story below, in addition to the alteration of the west piazza made by Bulfinch, which was executed.

To better explain his ideas to the President and Congress, Bulfinch had a model made of the Capitol.

"I have been engaged the past week and still continue so, in giving directions to a young man from Boston, Mr. Willard, who is making a model of our great building. He works in my room. I hope this will prove a satisfactory mode of conveying clear ideas of the several plans for finishing the centre, and enable the President and the Committees of Congress to select the one that on all considerations shall promise best."

When Bulfinch took charge, a large amount of stone had been accumulated for the Hall of Representatives, and marble for the stairways of the north wing. Only three of the marble columns, and two pilasters for the House of Representatives were complete, while the others were in various stages of progress. Fifty mantels (Figs. 49 to 51), marble doorways for Senate and House, all window-frames, sashes and parts of doors were completed.

Bulfinch in this report mentions a piazza on the north and south ends which Latrobe had proposed.

One of the first problems Bulfinch had to solve was to discover the cause of the accident to the brick arch which was intended to carry the cupola over the flat dome on the Senate wing. May 1, 1818, he made a report on the accident, saying that, having confidence in his predecessor, he instructed the workmen to complete the arch as directed by Latrobe; on loosening the centre "the arch moved four inches, the workmen left in alarm, and the Clerk-of-works [Lenox] informed me of the fact and I immediately went to the roof to view it with the Clerk, the principal of the stone department [Blagden], and the master mason."

The arch was forty feet in span, running from the north to the south, and thirty feet in width. It was to support a stone cupola intended to light the space beneath. The piers between the windows (see Fig. 41, plan, elevation) were intended to contain eighteen flues, twelve of which were carried over the arch from the west, three from the south and three from the north to this outlet.

Bulfinch attributed the failure, first, to the location of the fifteen-foot opening — ten feet nearer one side of the arch than it was to the other, also to the unequal distribution of loads produced by the chimneys. General Swift and Colonel Bomford, Engineers, were called in consultation. They agreed with Bulfinch that the arch would not bear any additional weight, and approved of his method of using a brick cone as a foundation for a cupola.

This report of Bulfinch's on the arch was not published until he sent in his report to Congress in the latter part of November, 1818.

Latrobe wrote an elaborate reply in December, 1818.[2] He states that the arch was not begun when he resigned, but from his interest in the matter he examined the stone and directed the beginning of the work.

The change from a vaulted ceiling to a wooden roof in the Senate Chamber made the arch necessary to support the cupola, which was required to light the vestibule of Senate and attic stairway, and to conceal the numerous chimneys which it was necessary to carry above the roof.

Although Latrobe thought the changes in Senate made this arch necessary, Bulfinch seems to have contrived a simpler method. Latrobe attributes the failure of the arch to improper haunches, or lack of any loading, and the error of the workmen in not putting

[1] "*The Capitol at Washington*," by C. A. Busby, Architect, 1 pg. letter-press plan and elevation. London, 1822.

[2] *American State Papers.* Miscellaneous Documents, Vol. II.

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any hoop around the circular opening, which he had uniformly done in similar cases. He justifies the use of iron by quoting its use in the domes of St. Paul's, St. Geneviève, and the Cathedral of Baltimore.

The question of the location, he justly says, could have had nothing to do with the problem if, as he says, the weakest side was ample to support the cupola.

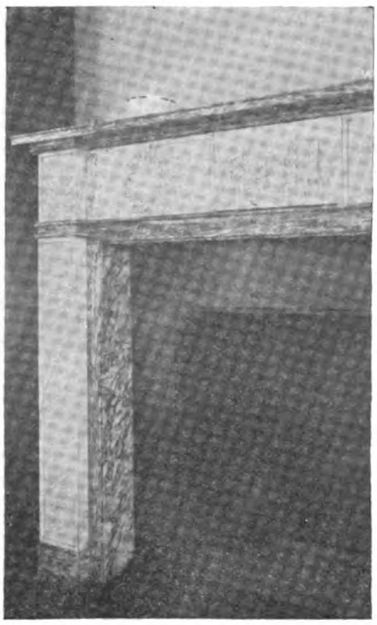


Fig. 49. Mantel under West Gallery in Senate Chamber.

The report of Bulfinch, November 21, 1818, gives an idea of the progress on the Capitol at that date. On the north wing the stone balustrade over the cornice, on the east and west side, the attic on the north and the stone cupola were complete. The roof was covered with copper. On the interior, the marble staircase was laid to the principal floor. The colonnade to the vestibule and part of gallery of Senate Chamber was completed. The apartments of upper story and the committee-rooms and offices on the principal floor were plastered and paved and the carpenter's work finished.

It was expected that the Court-room would be finished in December. The Senate-room was delayed by the difficulty in getting the marblework.

On the south wing the balustrade on roof was nearly complete. On the interior the columns of Brescia were completed and in place and the entablature and stone enclosure for gallery was built. The ribs of the domed ceiling were raised and secured, and the exterior roof was completed. In the centre, excavation had been completed for the "new work on the west of centre" (Fig. 47.). The foundations were laid and the cellar carried up to the level of the ground-floor arches. The external walls of basement were commenced.

The report of Mr. Cobb, Member of Congress, February 16, 1820, states that everything in the north and south wings was completed with the exception of painting, and a few changes desired by Congress.

The first appropriation for the purpose of commencing the central portion was made April 20, 1818. "Upon the request of a former committee of the House, the plan of the central portion has been changed from the design of the late architect, Mr. Latrobe, so as to afford more convenience and a greater number of necessary rooms. This alteration has been approved by the President [Monroe], and it is believed that it will not affect either the beauty or increase the cost of the erection, inasmuch as its external is substantially preserved, and its size diminished."[1]

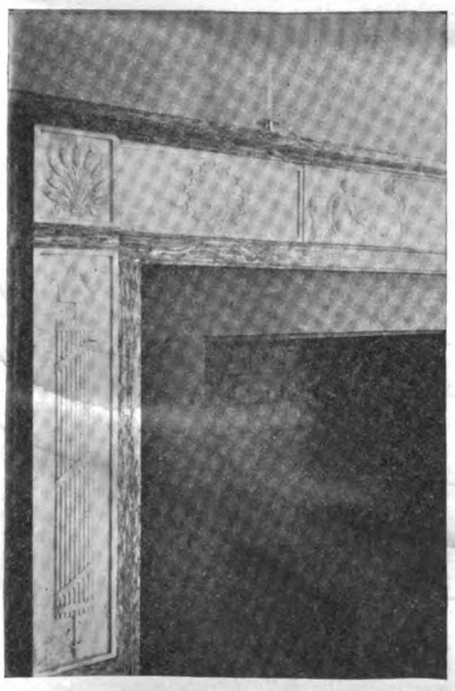


Fig. 50. Mantel under West Gallery in the Senate Chamber.

Congress must have taken its seat in the new Hall of Representatives in the latter part of 1819, or the first part of 1820, for at this period we find members complaining of the acoustic properties of the Hall.

[1] *American State Papers.* Miscellaneous Documents, Vol. II.

April 13, 1820, the House sent the following questions to Bulfinch in reference to preventing echo:

"1. Whether it can be remedied without total alteration?

"2. Whether anything can be added without destroying the beauty of the Hall?

"3. Would partial benefit justify the expense?"

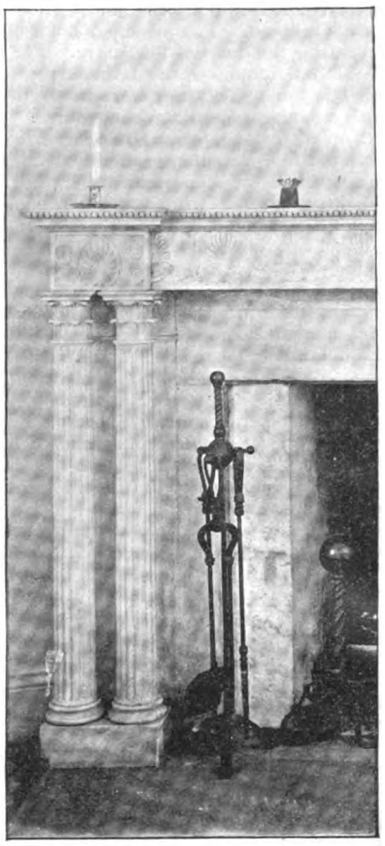


Fig. 51. Mantel in Senate Committee-room.

I have not been able to find the answer of Bulfinch to these questions, but the presumption is that no change was advocated unless it was a total change.

During the same year, 1820, Dr. Thornton was called on for advice on the same subject. He, a second time, advised hangings, and took the opportunity to call the attention of Congress to the deviations from his original scheme and to state how they had affected both the utility and beauty of the building.

During the year 1821, the number of mechanics employed on the central portion of the building varied from eighty in December to two hundred and twenty-nine in July.

About this period Samuel Lane was replaced by Joseph Elgar as Commissioner of Public Buildings, who, to effect an economy, proposed to reduce the salary of the architect.

Miss Bulfinch gives the correspondence between Bulfinch and his friends in reference to this proposed reduction.

[From J. Elgar to Charles Bulfinch.]

OFFICE OF COMMISSIONER OF PUBLIC BUILDINGS,
WASHINGTON, D. C., September 30, 1822.

Sir, — I have a painful duty to perform. It is that of announcing a general reduction of salaries, to take place at the end of the present year. Subsequently to that period yours will be $2,000 per annum.

Very respectfully, your most obedient servant,
J. ELGAR, *Commissioner of Public Buildings.*

Bulfinch protested through J. Q. Adams, making the claim that his salary was fixed by contract.

President Monroe referred the question to Attorney-General Wirt, who decided in favor of Bulfinch.

[President Monroe to Attorney-General Wirt.]

January 31, 1823.

Dear Sir, — I send you a paper, the claim of Mr. Bulfinch, which will not require five minutes' attention. The question evolved in it is whether the invitation to him to come here at a given salary formed a contract not to be altered, supposing his conduct to be correct, until the Capitol should be finished?

I wish an immediate answer, as I promised one on my part this morning.

J. M.

[Attorney-General Wirt to President Monroe.]

January 31, 1823.

Sir, — I am of the opinion that Mr. Adams's letter of 4th December, 1817, and Mr. Bulfinch's answer thereto, make a contract between the Government and that individual, which is unalterable by the mere will of either party, as if it had been, instead of a salary, a contract for a fixed sum to be paid for the whole work.

I have the honor to remain, sir, very respectfully,
Your obedient servant, WM. WIRT.

The report of Bulfinch in 1823 gives a clear synopsis of the state of the building at this period:

WASHINGTON, D. C., December 9, 1822.

JOSEPH ELGAR, ESQ., *Commissioner of Public Buildings.*

Sir, — The season for continuing the external work on the Capitol being near its close, I present a statement of the progress made thereon during the past year.

The exterior of the western projection [central portion] has been completed, by finishing the copper covering, painting the walls, and inserting the window-frames and sashes; the scaffolding is

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removed, and this front of the building exhibits the appearance it is intended to retain, being deficient only in the iron railings between the columns of the loggia, which are in forwardness, and will soon be executed. The two principal stories of committee-rooms, with their extensive passages or corridors, are plastered, and a great portion of the carpenters' work is finished. The principal labor of the season has been devoted to raising the dome of the centre. For this purpose, the interior walls of the rotunda were continued; as soon as appropriations were made in the spring, they were raised to the full height, and covered with entablature and blocking course. The exterior walls were carried up with stone, formed into large panels, and crowned with a cornice and four receding gradins; about two-thirds of the interior dome is built of stone and brick, and the summit of wood. The whole is covered with a wooden dome of more lofty elevation, serving as a roof; it is hoped that a few days of favorable weather will enable the workmen to sheath it securely, when it will be in readiness for the copper covering. It will be finally crowned with a balustrade, to surround a skylight of twenty-four feet diameter, intended to admit light into the great rotunda. This work has required a great effort to complete it, from the mass of stone and other materials employed in it, and raised and secured at so great a height. I cannot omit this occasion to mention the ingenuity and persevering diligence of the superintendents of each branch of the work, and cheerful and unremitted exertions of the workmen, in their endeavors to execute their orders, and to bring this part of their labors to a close. I sincerely hope that the effects of our joint efforts will meet the approbation of the President of the United States, and the Representatives of the Nation.

Respectfully submitted, Charles Bulfinch,
Architect of the Capitol of the United States.

We find Bulfinch requesting a guard and guides as the Capitol approaches completion.

On December 10, 1824, the fact is recorded that the interior of the Capitol is finished, with the exception of some painting on the stone-work "which is not sufficiently seasoned to receive it."

The colonnade of the east portico was incomplete.

May, 1825, it was determined to hold a competition for the figures in the pediment of the eastern or principal portico. A premium was



Fig. 52. Pediment of Western Central Portico, showing Group by Persico.

offered, probably at the suggestion of President J. Q. Adams, for these pieces of sculpture.

The following extract from a letter of Bulfinch's gives an idea of the method and cause for the adoption of the present sculpture in the pediment of the eastern portico (Fig. 52).

"Our work at the Capitol proceeds but slowly, owing to the delay of contractors in delivering the large blocks for columns. We have received only four this season, which are raised into their places, and must have seven more before the much-talked-of pediment can be commenced. With respect to the ornament proposed to decorate this, the artists in general feel much disappointed; about thirty persons presented thirty-six designs, some well and others badly executed, but none answering the President's idea of a suitable decoration for a legislative building. He disclaimed all wish to exhibit triumphal cars and emblems of victory, and all allusions to heathen mythology, and thought that the duties of the Nation or its Legislators should be expressed in an obvious and intelligent manner. After several attempts the following has been agreed upon: a figure of 'America' occupies the centre, her right arm resting on the shield, supported by an altar or pedestal bearing the inscription, 'July 4th, 1776,' her left hand pointing to the figure of 'Justice,' who, with unveiled face, is viewing the scales, and the right hand presenting an open scroll inscribed 'Constitution, March 4th, 1789.' On the right hand of the principal figure is the eagle, and a figure of 'Hope' resting on her anchor, with face and right hand uplifted, — the whole intended to convey that while we cultivate justice we may hope for success. The figures are bold, of nine feet in height, and gracefully drawn by Mr. Persico, an Italian artist."

Glenn Brown.

[To be continued.]

A Mural Decorative Competition in Cincinnati. — The Municipal Art Society of Cincinnati has opened a competition for the decoration of the entrance hall of the new Cincinnati City-hall. Twenty-five hundred dollars have been raised for this purpose, of which sum two prizes of $200 and $100 will be given for the two best designs entered, leaving $2,200 for carrying out the work selected. Designs must be sent in before December 31, addressed to the secretary, J. H. Gest, Cincinnati Art Museum. The circulars furnish further particulars, and should be consulted by artists intending to compete. — *Boston Transcript.*

JONES'S PORTICO OF OLD ST. PAUL'S.

THERE is an unprofitable controversy as to the exact date of Jones's commission for the repairing of St. Paul's. It is sufficient for us that the work of restoration was active in 1633, and proceeded without interruption till the great Civil War. All writers concur in admitting that restoration was necessary, though few allow that this was done in a way creditable to the genius of the architect. The cathedral, according to the unimpeachable testimony of Wren, was in a sad state of dilapidation and decay; indeed, it does not appear that any material addition or even repair had been made since the days of Henry III. The houses of London, chiefly in those days composed of wood and built as suited the fancy or the purse of the proprietors, were huddled close and high; and the fresh air, the free sun, and, what was perhaps worse in the eyes of an architect, a complete view of the church, were little thought of. To give scope for improvement and secure a view of the cathedral to the citizens, the removal of a number of houses was recommended, and armed with power, Inigo cut away to his new work with less ceremony than many thought decorous. Some were offended at having a fireside, where they and their ancestors had sat for generations, rudely shovelled away; others were enraged because the shop in which they carried on a lucrative trade was pulled down and "a compensation" awarded, which they regarded rather as a contemptuous acknowledgment than even an imperfect repayment of the injury sustained; while a third class, and a much more numerous one, saw with no good-will the re-edification of what all of them termed a steeple house, and not a few the chief stronghold of Dagon. The demolition of these houses and the restoration of the cathedral were both bitterly remembered afterwards. "In the restoration of St. Paul's," says Walpole, "Inigo made two capital faults. He first renewed the sides with very bad Gothic, and then added a Roman portico, magnificent and beautiful indeed, but which had no affinity with the ancient parts that remained, and made his own Gothic appear ten times heavier." Of this splendid mistake — this Grecian portico to a Gothic structure — there is a ground-plan and elevation to scale in Kent's "Designs of Inigo Jones." The entire west front measures 161 feet long and 162 feet high from the ground to the top of the cross; a tower at each angle rises 140 feet, while over these ascends the central peak, ornamented with pinnacles terminating in a cross, and forming a screen to the end of the main roof of the building. The whole of this front is of the Corinthian order rusticated, and may be described as cumbrous in form, but picturesque in its effect. It is far otherwise with that noble portico to which the work described serves at once as a background and a contrast. This reaches in length 120 feet over the bases of the columns, and rises 66 feet, measuring from the first step — of which there are five — to the summit of the balustrade. There is no pediment, inasmuch as the picturesque rusticated peak performs, in some degree, the part of a pediment; nor is the effect, though startling at first, at all unpleasing, though it rises nearly 100 feet above the balustrade. There are in all fourteen fluted columns, of which eight stand in front and three on either side; nor are these last crowded, for the projection measures 42 feet. At each angle there is a square pilaster, proportioned and diminished like its circular companions, with half pilasters to correspond, where the portico unites with the wall. On the front line, and on the return of these pilasters, a column stands so close that the capitals and bases are all but touching; in the centre of the portico the space between the columns measures 11 feet, while that which separates the others is only 9 feet; thus giving air and access to the principal door. The columns, including capitals and bases, measure 46 feet high. On the parapet corresponding with each column a pedestal is inserted, breaking forward, and rising nine inches above the cornice, serving at once as a blocking to the balusters and a support to a statue, of which the architect had designed ten, all princes and benefactors of the church. Nothing in this country was seen so nobly proportioned and so simply splendid as this portico. The pilasters, coupled to columns at each corner, are a great beauty — varying the sameness of the design, and preserving the perpendicular profile of the angles, which the square projections above and below seem to require, and which circular columns sacrifice. Such are the dimensions of this far-famed portico; they differ materially from the measurements given in Walpole. "The great repair, or restoration, of St. Paul's by Jones," says a note in Dallaway's edition, "presented a pile of massive ugliness, which neither before nor since has been imagined or executed, resembling the Egyptian pyramids in style, much more than any ecclesiastical building in Europe. Perhaps he might intend that such heavy plainness should contrast more strongly with the portico, which was the redeeming feature of the whole design, and which for grandeur and extent must be considered as an admirable example of his talent. This portico, according to the scale of Harris's plan, was 200 feet in length, 50 feet in depth and 40 feet at the least in height to the top of the balustrade and parapet — there was no pediment." A pair of compasses and a little consideration might have shown that a portico of these proportions would be much more squat than stately; that though the extent was great, the grandeur could be but little, and that in fact the elevation, according to the number of columns, was not likely to be attempted in this or any other country. The columns, with their capitals and bases, according to this distribution would be about 25 feet high instead of 46 feet, and the spaces between them 20 feet instead of 9 feet,

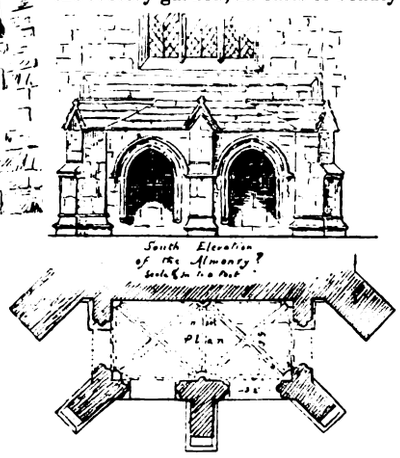
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supposing the corner pilaster and the companion column to be coupled as the design evidently requires. Had this portico exhibited such squat columns and extensive openings it would have little merited the praise of Dugdale, who says: — "This most magnificent and stately portico the king erected at his own charge at the west, and here he placed the statues of his father and himself for a lasting memorial of this their advancement of so glorious a work, which portico was intended to be as an ambulatory for such as usually walk in the body of the church and disturb the solemn service of the choir." The columns of the Temple of Diana at Ephesus weighed one hundred and ten tons each, and the central stone of the vast entablature, covering an opening of 22 feet, was not less than one hundred and fifty tons, the setting of which in its place the wondering architect imputed to the goddess herself, for he declared it surpassed human skill. Now the central opening of the St. Paul's portico, according to Walpole's scale, could not be less than that of Ephesus, but we have a sure authority for saying that the stone which lintelled it did not weigh twenty tons. Webb, speaking of this very architrave stone, says: — "It is much less in bulk than any of those which at Stonehenge lie over the pilasters of the greater hexagon, and was two years at least before it could be come at and drawn forth of the vast quarries of Portland, notwithstanding that they were bared and wrought in many years before. And after that it was drawn forth and landed at Paul's Wharf, more than a fortnight's time was spent ere it came into the churchyard, though as many men were employed about the same as the greatness of the weight required, and might reasonably be set on work." Now the architrave stones of the greater hexagon of Stonehenge weigh something under sixteen tons each, for they contain no more than about 200 cubic feet. It is needless to enter further into the refutation of this portico of the imagination. — *The Architect.*

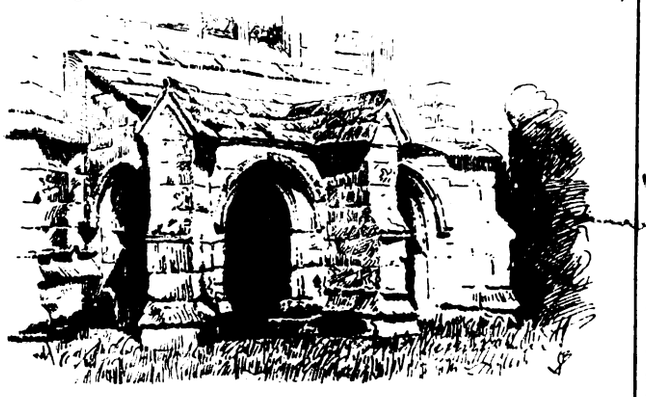
BISHOPSTONE CHURCH, WILTS, ENG.



THIS noble parish church, nestled in a hollow surrounded by chalk downs, was dedicated in the thirteenth century to the memory of St. John the Baptist. Externally, it stands with its square tower close to the rectory garden, an oasis of beauty

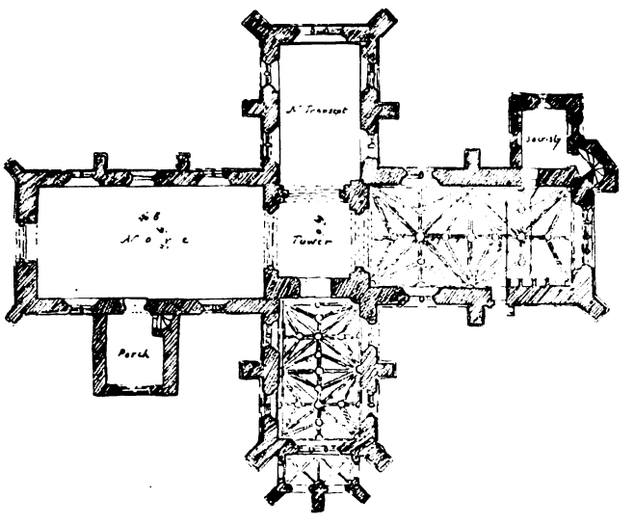


in a desert of bleak hills. But it has a special peculiarity of its own, interesting, at once, to the antiquary, the architect and the archæologist. This is a singular erection attached to the end of the south transept, variously called a lich-ward, a tomb and an almonry — the latter being the most favored solution. It contains a flat stone coffin,



but most probably this was placed there in later years. As will be seen from the plan, the edifice is a species of double-arched porch, with arched ends and a groined roof. The arches are pointed, and of elegant proportions; the side against the church is arcaded, the other three sides being open.

Another peculiar feature of the church is the priest's door, leading into the chancel, which is sheltered by a beautiful porch or hood. It is elegantly groined, and exhibits in elevation, a foliated arch under an ogee gable, crocketed, finialled and springing from grotesque



Ground Plan

heads, similar to those upon the sedilia within the chancel with which the door communicates.

The church dates from the thirteenth and the fifteenth century. The ceiling of the nave is flat; the tie-beams being supported by brackets and spandrels resting upon small corbels. The north transept ceiling is also flat; but the roof of the south transept and the choir are vaulted. The position of two chantry altars may be seen by the remains of the *piscinæ* and niches — ogee-headed, trifoliated, with a hood finialled.

The so-called "Founder's tomb" is a huge recess at the end of the north transept, under a multifoliated, segmental arch, stretching entirely across the transept; the canopy terminating on either side with pinnacles. Under the opposite window is a modern canopied tomb, erected to the memory of the late rector, George Augustus Montgomery (a member of the Pembroke family), a very beautiful specimen of Pugin's artistic work. The pulpit contains some fine carved-oak panels, brought from Flanders and Spain by Mr. Montgomery — the latter of seventeenth-century workmanship, and colored.

From the sacristy, a spiral staircase (the outer walls of which form a circular turret) leads to the vaulting over the chancel and to the tower.

The sedilia are very fine, each of the three seats having a gable with finialled and crocketed gables, somewhat heavy in character and wanting in grace; but this cannot be said of the windows of the chancel, which are exquisitely beautiful — trifoliated with spherical sides — pear-shaped.

The plans and sectional drawings are taken from the account of the church by Owen Carter. S. BEALE.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

FRONT OF THE URSULINE CONVENT, NEW ORLEANS, LA.

[Gelatine Print, issued with the International and Imperial Editions only.]

WE are told that this group of buildings dates from about 1824.

ST. PHILIP'S ROMAN CATHOLIC CHURCH, BOSTON, MASS. MR. P. W. FORD, ARCHITECT, BOSTON, MASS.

THIS new Roman Catholic Church is now being erected on Harrison Avenue, Lenox and Reed Streets. The building, when completed, on the exterior will be a brick structure liberally trimmed with Longmeadow brownstone, and will be roofed with Brownville, Me., slates. The following will be the external dimensions, viz: total length, 104′; total width across back end, 102′ 2″; total width at front, 113′ 6″; width across transepts, 106′ 2″, and width across nave, 77′ 10″. The height of ridge of roof over front sidewalk will be 70′, and the height to top of cross on spire will be 148′. The church is Cruciform in plan and viewed from the outside, in perspective, the building will show a nave, transepts and apsidal sanctuary of equal height, a tower and spire of harmonious proportions and twin sacristies. The interior will have full groined ceilings in

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plaster, quartered-oak pews and standing finish, clustered marble pillars and hardwood floors. The seating capacity of the church will be 1,280; it will be heated by steam.

THE MINNESOTA STATE-HOUSE, ST. PAUL, MINN. MR. CASS GILBERT, ARCHITECT, ST. PAUL, MINN.

INTERIOR VIEW IN THE HOUSE OF B. F. SMITH, ESQ., WASHINGTON, D. C. MR. ROBERT HEAD, ARCHITECT, WASHINGTON, D. C.

INTERIOR VIEW IN THE HOUSE OF M. M. CRENSHAW, ESQ., WASHINGTON, D. C. MR. ROBERT HEAD, ARCHITECT, WASHINGTON, D. C.

HALL IN THE HOUSE OF A. P. WOOLBRIDGE, ESQ., AUSTIN, TEX. MR. J. RIELY GORDON, ARCHITECT, SAN ANTONIO, TEX.

[The following named illustrations may be found by reference to our advertising pages.]

SPECIMEN OF PEN-AND-INK RENDERING, SUBMITTED FOR THE HENRY PERRY LELAND PRIZE, BY JANE HOVEY ALLEN, SCHOOL OF INDUSTRIAL ART OF THE PENNSYLVANIA MUSEUM.

We have been requested by a member of the jury of award to publish these three drawings which were held to be, under the circumstances, of "unusual merit."

SPECIMEN OF PEN-AND-INK RENDERING, SUBMITTED FOR THE HENRY PERRY LELAND PRIZE, BY MARTHA WALTER, SCHOOL OF INDUSTRIAL ART OF THE PENNSYLVANIA MUSEUM.

SPECIMEN OF PEN-AND-INK RENDERING, SUBMITTED FOR THE HENRY PERRY LELAND PRIZE, BY LEON DEMO, SCHOOL OF INDUSTRIAL ART OF THE PENNSYLVANIA MUSEUM.

A GROUP OF GATEWAYS.

[Additional Illustrations in the International Edition.]

REAR VIEW AND CHAPEL OF THE URSULINE CONVENT, NEW ORLEANS, LA.

[Gelatine Print.]

COURT-YARD OF THE URSULINE CONVENT, NEW ORLEANS, LA.

[Gelatine Print.]

COMPETITIVE DESIGN FOR NATIONAL TELEPHONE CO.'S OFFICES, WELLINGTON ST., LONDON, ENG. MR. THOMAS MANLY DEANE, ARCHITECT.

CASTLE PARK, LINLITHGOW, NORTH BRITAIN. MR. J. GRAHAM FAIRLEY, ARCHITECT.

NEW PARISH CHURCH, UPHALL, ENG. MR. J. GRAHAM FAIRLEY, ARCHITECT.

COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

THE FIGURE OF ST. JOSEPH ON THE ROCHER D'ESPALY, LE PUY.

MILWAUKEE, WIS., ~~September 22, 1896.~~

To the Editors of the American Architect: —

Dear Sirs, — In your article on "Le Puy," published last week in the *American Architect*, there appears a passage upon which I may be able to say something of interest.

The statue on top of the Rocher d'Espaly, of which you make remark and concerning the nature of which you are uncertain, is not a statue at all, but a silhouette of sheet-iron supported by stays from behind! Your photograph is taken from a position fortunate enough, not to make this apparent.

And the main statue of the Virgin above the Cathedral, whether of iron or bronze, has just been painted the most undesirable color imaginable. Yours very truly, Elmer Grey.

NOTES AND CLIPPINGS

A Forgotten Chapel in the Vatican. — The oldest decorated walls in the palace are those by Fra Angelico in the Chapel of Nicholas. One other such at least there is. High up in the Borgia Tower, above the Stanze of Raphael, is a suite of rooms once inhabited by Cardinal Bibbiena, of the Chigi family, and used since then by more than one assistant secretary of State. There is a small chapel there, with a window looking upon an inner court, which was once the luxurious cardinal's bath-room, and was beautifully painted by Raphael in fresco, with mythological subjects. In 1835, according to Crowe and Cavalcaselle, Passavant saw it as it had originally been, with the frescos, though much damaged, still beautiful, and the marble bath still in its place in a niche painted with river gods. In one of the Vatican's periodical fits of prudery, the frescos were completely hidden with a wooden wainscot, the bath-tub was taken away, and the room was turned into a chapel. It is believed, however, that the paintings still exist behind their present covering. — *"The Vatican," by F. Marion Crawford, in the August Century.*

Wells and Well-water. — It has been a widespread popular opinion that the purity of water obtained from deep wells, especially from deep wells of the kind known as "driven" wells, might be depended upon. Of late, however, there has arisen a doubt of the accuracy of this belief, and scientific investigation has now shown it to be erroneous. Examination of waters from a considerable number of springs and deep wells by the bacteriologist of the Massachusetts State Board of Health, has shown that bacteria are present in water taken not only from springs and open wells, but from carefully guarded wells of quite extraordinary depth. The results of the investigations prove that Sternberg, Abbott and other high authorities were in error in believing waters from deep sources to be free from bacteria. Frankland, in his *"Micro-Organisms in Water,"* evidently had doubts, but his investigations led him to believe that such waters, although, perhaps, not wholly free from micro-organisms, possessed a high degree of bacterial purity. It is difficult (says the report of the Board) to find deep wells in the uninhabited or country districts, and our results are all derived from populous areas. It is possible that other results might be obtained from wells driven in uninhabited regions. It is plain, however, that water absolutely free from bacteria is not ordinarily obtained from even deep wells, and that many deep wells contain as numerous bacteria as are found in many surface waters. — *The Churchman.*

The "Petrified City." — Among cities of fable the petrified variety was interesting. We have it in most parts of the world — our prosaic islands knew it, but as a submarine curiosity. In the days when London enjoyed the presence of an Ambassador from Tripoli, that personage astonished the Royal Society once at least. The famous traveller, Dr. Shaw, had mentioned the story of a petrified village near Cyrene. Scientific people derided it, scientific people upheld it — in short, a discussion arose. Some members of the Royal Society, recollecting that there were grave and responsible inhabitants of Tripoli within reach, put the question before the Ambassador. He explained with a vengeance. One of his friends, a person, of course, whose honor could not be impugned, was well acquainted with the spot. Shaw made a great mistake in describing it as a village. City was a proper word. The walls enclosed an exact circle, numerous streets crossed at right angles, with shops and avenues of trees, and a noble castle stood in the midst. In the shops and streets were people variously employed — the gentleman noted, in especial, a baker and his customers' loaves in hand, a woman suckling her baby, and so forth. He entered the castle and found a king, or somebody of rank, lying on a gorgeous bed with guards about him. Animals abounded, such as donkeys, camels, oxen, sheep and birds. But everything was stone of a peculiar bluish tint, even the money lying on shop counters and in people's hands; witness brought a quantity away, and the Ambassador regretted that he could not find some pieces presented to himself at the moment. A description was forthcoming, however; the coins were as large as English shillings, with a horse's head on one side and writing in unknown characters on the other. A happy little touch represented that many of the figures had lost head or limbs — petrifications will not endure forever, of course. The Royal Society expressed warm gratitude for this communication. It is scarcely worth while to seek the origin of a fable which is sufficiently explained by the vagaries of imagination. That it was localized at Cyrene — among countless other spots — may be due to the existence of a large and well-preserved necropolis there, with many statues erect in Shaw's time, if not now. He himself made a long and perilous journey to Harnam, in Numidia, where, as the Arabs avouched, a Bedouin encampment was on view, surrounded by oxen and sheep, all turned to stone. In this instance no shadow of foundation for the legend could be found. But it was so widely diffused in those days that rumors of the marvel reached the court of France, and M. le Maire, Consul at Tripoli, received instructions to inquire. He employed some Janissaries, who even undertook to bring away a petrified Bedouin; but they pointed out, very reasonably, that a full-grown specimen would be too heavy. The Consul declared that a baby would satisfy him, to begin with at any rate. After many months, during which his interest was kept up by frequent drafts for expenses, the Janissaries returned, and sure enough they had a stone baby — a very pretty one too, for it proved afterwards to be a little statue of Cupid found among the ruins of Leptis; they had broken off the wings and quiver. Bruce also was tempted to visit this spot, called Ras Sem; and Captain Smyth, of her Majesty's ship "Adventure," went in search of it, but in another direction. The Sultan of Fezzan told him a story much like the Ambassador's, and he travelled, full of hope, nine days through a desert country. In this case, however, there were really buildings and bas-reliefs of men and animals, if not statues. — *London Standard.*

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THE Thirtieth Annual Convention of the American Institute of Architects will meet in the rooms of the Engineering Association of the South, at Nashville, Tennessee, on Tuesday, October 20, at 10 o'clock A. M. The programme for the proceedings is a particularly interesting one, including the report of the Legislative Committee on Government Architecture, that of the Committee on a National Building for the Institute, and a discussion on the Influence of Steel Construction, and of Plate Glass, on the Development of Modern Style, which is to be introduced by the reading of papers on the subject, prepared by Professors Osborne and Ricker, and Messrs. Andrews, Yost, Adler and Newton. Mr. Aiken is also to read a paper on National Architecture, which is likely to be of special interest under present circumstances. The Engineering Association of the South has appointed a Committee to assist the Institute Committee of Arrangements in entertaining the members of the Convention, and similar Committees have been delegated for the same purpose by the City Council, the Chamber of Commerce, the Directors of the Centennial Exposition, and the local architects, so that the comfort and pleasure of persons attending the Convention seems to be assured. A special train will leave New York for Nashville at 5 P. M. on Sunday, October 18, by the Royal Blue Line, from the station of the Central Railroad of New Jersey, reaching Nashville at 6.25 A. M. on Tuesday. On the return trip, the train will leave Nashville at 9.15 A. M. on Friday, and reach Chattanooga at 2.40 P. M. The afternoon will be occupied in visiting Chattanooga and the Chickamauga battlefield, and the night will be spent on Lookout Mountain. The next morning, Saturday, the party will leave Chattanooga at 7.30 A. M., and arrive at New York at 12.50 P. M. on Sunday. The single fare from New York to Nashville is $25.65, and sleeping-car ticket $6 extra. It is hoped that arrangements can be made for securing return tickets at one-third the regular rate, which would make the total fare both ways, including sleeping-car tickets, $46.22. The trip can also be made from New York partly by the steamers of the Old Dominion Line, leaving New York at 3 P. M. on Friday, October 16, for Portsmouth, and thence by rail, via Atlanta, to Nashville. If fifteen or twenty persons should choose this route, the fare for the round trip would be $42.75.

THERE are some things which we do better than our English cousins, and one of these is certainly the management of fire-extinguishing appliances. One evening, a few weeks ago, fire broke out in a hardware store on the principal street of Ilfracombe, a fashionable watering-place in Devonshire. An attempt was made to ring in an alarm, but the electrical signal system was "out of order," and refused to respond. After some time had been spent in ineffectual struggles with the electrical apparatus, some one was sent to ring a big bell in the neighborhood. This called the attention of the citizens, and, incidentally, of the members of the fire-brigade, who got together and brought the engines to the spot. It was then discovered that there was no water in the hydrants, and it turned out that the town council, with the laudable purpose of reducing expenses, had, two days before, given orders that the water should be shut off from the hydrants at night. The town magnates were then hunted up, and an order obtained to have the water turned on for this special occasion. Meanwhile, the fire had spread across the street, and, notwithstanding the fact that it rains nearly every day in Devonshire, and that everything is saturated with moisture, was making excellent headway toward the entire destruction of the town. After the water was turned on to the hydrants, there was another disappointment, as no result followed the opening of the valves. Then some one recollected that repairs were to be made in the pipe system, and that the town engineer had directed that the water should be shut off that night at the waterworks, a mile and a half away. There was no telephone, telegraph or other means of signalling to the waterworks, so a messenger was sent to make personal application to the engineer. On his arrival, some time later, the engineer, after hearing his story, ordered the gate to be opened, and in due course the water reached the hydrants, and was conveyed by the engines to the fire; but not until half a million dollars' worth of property had been consumed.

AN extraordinary sort of fireproof lathing has been introduced into Germany, consisting, essentially, of little cross-shaped bits of terra-cotta, strung on wires, which pass through them in two directions, at right angles with each other. One would think that such a combination would be expensive, but it is claimed to be cheaper in use than ordinary wire lathing, inasmuch as the terra-cotta crosses take the place of a large part of the plastering mortar. The mortar is said to adhere very strongly to the terra-cotta, in addition to the excellent clinch afforded by the network, and, of course, the fireproof qualities of the material are nearly perfect. The crosses are stamped out of clay, and are, presumably, strung on the wires by machinery. It is sold, in rolls, one metre wide, and five metres long, containing thus nearly six square yards, at three marks and a half, or eighty-four cents. This is quite as cheap as plain wire lathing, to say nothing of the saving of mortar by its use, and the application of the new lathing seems to be even easier than that of ordinary wire lathing, as it gives a good clinch when nailed directly to boarding or timbers, without furring. The German manufacturers are Herren P. Stauss & H. Ruff, Cottbus, Germany. They advertise that their foreign patents are for sale, and it would certainly be desirable to have so promising a material put into the hands of a public so much interested in fireproof construction as that of the United States.

MR. J. D. LYMAN, of Exeter, N. H., is a practical grower of trees, who adds to his long experience a deep conviction of the importance of tree-cultivation as a branch of industry. In 1870, he bought a deserted farm, about forty miles from Exeter. On this farm was a little grove of pines, covering about two-thirds of an acre. Taken by itself, this grove, as he says, at the time of his purchase of the farm would not have sold for much, if any, over one dollar, and perhaps would not have brought more than fifty cents. He found a man living in the neighborhood, who was glad to thin out the trees according to his directions, receiving, as pay for his work, the thinnings, out of which he made stakes, kindling-wood, and some top-poles for fencing. Some six years later, the grove was thinned again in the same manner; and, since then, irregular thinnings have been made, and the trees have been unsystematically pruned. At present, there are one hundred and forty-six trees in the grove. Most of these were twenty-five or thirty years old when the lot was bought, so that they are now from fifty to fifty-five years old, and the cost of the entire grove now amounts to about one dollar, with twenty-six years' interest, and the cost of pruning, which has been, including interest, about two dollars more. Allowing something for the value of the land after clearing away the trees, the total cost of the grove, including interest and taxes, and expenses of cultivation, would probably be less than five dollars. To test

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the results of his experiment so far, Mr. Lyman had one of the largest and one of the smallest trees in the grove cut, and sawed into inch boards. These two, which he considered to represent a fair average for the whole grove, produced five hundred feet of boards, of a quality much superior to the box-boards commonly made out of second-growth pine. If the trees should be left to grow twenty-five years longer, they would increase in size, and the lumber would be clearer and more valuable, but if the grove should be cut down now, its product would be at least thirty-three thousand feet of lumber, worth probably, on the stump, not less than one hundred and fifty dollars, or more than thirty times the total cost of the grove, including interest and taxes. A revenue of one hundred and twenty per cent per annum on an investment which cannot be lost or depreciate is worth waiting for; and Mr. Lyman's figures are, probably, less favorable than the reality. For a rough estimate, he thinks that an acre of ordinary poor New England land may be depended upon to produce as many thousand feet of pine lumber to the acre as the average age of the trees in years; so that his grove, twenty-five years hence, would be worth two hundred and fifty dollars; or, as the quality of the timber improves with age, perhaps three hundred dollars, instead of one hundred and fifty; and, in the meantime, the pruning and thinning would have furnished kindling, fencing and other material to a very large amount. Poor as the New England farmer thinks himself, there is not a silver mine, or commercial enterprise, or banking business in the United States, which will yield such enormous returns on a small investment of capital as a piece of forest land intelligently treated; yet there are, in the State of New York alone, eight hundred and sixty thousand acres of "waste land," bringing to their owners nothing but taxes and loss of interest, which, if planted, and treated with even the small amount of care that Mr. Lyman bestowed on his grove, would, by the time that the great-grandsons of the present proprietors had attained their majority, be covered with timber worth at least two hundred and fifty million dollars, while the land, enriched by the decaying leaves, would be worth, after the timber was cut away, far more than it is now. This land, like many thousands of acres of better land in Massachusetts, already covered with forest, could probably be bought for something like twenty-five cents an acre, so that an investment of a thousand dollars now would grow to at least a million before the grandchildren of the investor had become too old to enjoy their wealth.

IN regard to the details of American steam-heating, the *Builder* presents, in a recent article, some queer ideas. It supposes, apparently, that American architects know little or nothing about hot-water heating, and says that steam is preferred here because "the architects rely upon the tradesmen for details, and these latter prefer steam because it is easier to plan and set up a steam-heating apparatus which will work than to do the same with a hot-water apparatus." "Add to this," it says, "that steam-boilers and fittings, in a country which is the paradise of machinery, can be readily obtained, that the plant for a steam-heating apparatus is cheaper than for a hot-water one, and that it is easier to 'scamp' work with steam than with hot water, and quite sufficient reasons exist for the tradesmen's preference." The idea that American architects leave it to the "tradesmen" to say whether their buildings shall be heated by steam or hot water will astound the profession in this country, while the notion that the "tradesmen," thus empowered to make the choice, choose steam because it is easier to "scamp" a steam apparatus than one for hot water, is not less complimentary to the heating contractors of the United States. The fact is, that hot-water is used for warming private houses in America to a very large extent, and the reason why American architects do not usually favor it for public buildings is not that they are unaware of its easier regulation, its economy of coal, or its other advantages, of which the *Builder* speaks, but that a sudden frost, in a building which is not continuously warmed, may do many thousand dollars' worth of damage by freezing and bursting the pipes and radiators. When such accidents, which occur frequently enough to put architects on their guard, are not to be feared, hot-water heating is used in America, in many instances, on a very large scale. We have in sight from where we are writing two office-buildings, each containing twelve stories of rentable space, both of which are warmed by hot water, and hot-water heating is used in perhaps most of the modern public libraries in the States, and in many school-houses and churches. It may be interesting to English architects to know that in some instances the hot water for warming these buildings is heated by exhaust steam from the engines. The *Builder* seems to have a rather cloudy idea of the use of exhaust steam for heating. The grease-trap, which is generally employed, where the exhaust steam is used for heating, and the condensed water returned to the boiler, to prevent corrosion of the boiler from the products of decomposition of the grease brought back in the return-pipes from the radiators, it imagines to be a device for preventing oil from being carried into the radiators, and says that if this accident should happen, the heating capacity of the radiating surfaces would be "materially interfered with." This idea will amuse the "tradesmen" in this country, of whose honesty the *Builder* has so low an opinion; for all pipes and fittings are liberally oiled in threading, and are put together with oil and lead, and, in general, shine with grease; so that, in point of fact, it is the oil which is brought back in the return-pipes which forms the most serious trouble in heating by exhaust steam. From this trouble the comparatively new method of heating by means of water, which is itself warmed by the exhaust steam, gives a means of escape. The water is heated in a tank, by a coil of pipe, through which the exhaust steam passes, either escaping from the end of the coil into the atmosphere, or being condensed and returned to the boiler, according to circumstances. As the coil in the heating-tank, surrounded by the water to be warmed, acts as a surface condenser, and the distance through which the exhaust steam must be forced is very small, there is practically no back-pressure on the engine, and, as the exhaust steam does not pass through the radiators, there is no trouble with grease from this source in the condensed water returned to the boiler; while the temperature of the water can be accurately, and even automatically, adjusted, by means of a by-pass valve allowing a larger or smaller proportion of the exhaust steam to escape without circulating through the heating coil.

MOST architects and engineers have either used or seen the instrument known as Amsler's planimeter, with which, by tracing on a map, at any scale, the outline of a pond, or a tract of land, of any shape, the number of square feet contained in the area can be read on an index dial attached to the instrument. This planimeter, which makes its calculations by means of gearing which combines the polar coördinates of each portion of the outline, is, naturally, an expensive affair, but a tolerable substitute has been invented for it, the simplicity and cheapness of which are only equalled by its ingenuity. The description of the new "Axe-Planimeter," which is the invention of Captain Prytz, of the General Staff of the Danish Army, is very brief. It consists of a stout iron wire, about a foot long, turned down at each end. One end is sharpened to a point, while the other is flattened, in the plane of the length of the rod, and sharpened to a curved edge, like that of an axe. In use, the instrument is held approximately in a vertical plane, with the pointed end on the map, and the axe end on a blank piece of paper. The outline of the tract to be measured is then traced by the point, the sharp edge of the axe moving at the same time over the record-paper. When the tracing is complete, the instrument is laid aside, and the distance between the beginning and the end of the scratch made on the record-paper by the axe edge is measured along the scratch. This distance, taken at the scale of the map, multiplied by the length of the instrument, will give the area of the tract measured. At first sight, the idea of obtaining even approximate planimetric measurements by such rude means seems preposterous; but it is not so much so as would appear. It is evident that the sharp edge of the axe can move only in a direction parallel with that of the instrument. Hence, the line described by the edge consists of zigzags, the length of which depends directly on the contour of the area to be traced, while the angles between the lines of the zigzag depend upon the relation of the length of the instrument to the contour to be traced. In this way all the elements of the contour, however complex this may be, enter into the final result, the simplicity of which is by no means due to the simplicity of the mathematical operations involved. As the zigzag lines of the scratch made by the axe are measured as straight lines, while they are really slightly curved at the ends, there is a small error in the result; but, with care to keep the map and the record-paper in the same plane, and not try to measure areas of a diameter greater than half the length of the instrument, except by subdividing them, the approximation to the true area is very close.

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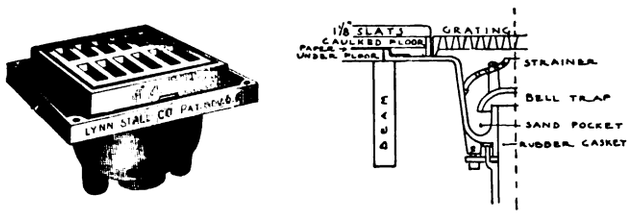


Fig. 1. Catch-basin and Trap for Carriage-wash.

THE problems involved in the construction of a stable are neither extended nor complicated and are more matters of detail than of general arrangement. In the large stables intended to accommodate one hundred horses or more, there are no complicated conditions whatever and the planning is of the simplest sort. In the smaller stables there are a few general considerations which have to be borne in mind, though these are usually modified by fixed relations to existing structures or to the locality.

The architect has but little control over the placing of a stable, as usually there is but one portion of a lot or estate where it can be placed to advantage. In general, however, it is best to have the exposure such that the stalls and the paddock will be on the side towards the sun and away from the residence, while the man's room and the harness-room should by preference be towards the main house and, if possible, the stable should be to leeward of the house, measured by the prevailing summer winds. Small stables ought never to be tolerated in a closely built-up section of a city, and where such do exist, the conditions are so unfavorable that they need hardly be studied as types. The ordinary private stable can generally be placed at sufficient distance from the house to be unobjectionable, and consequently the arrangement is substantially the same for stables either in the suburbs or in the country. Stables are usually built of wood, without a cellar, and are supported either upon brick piers or cedar posts. The only advantage of a cellar is that of making the superstructure a little dryer and less affected by extremes of cold; but unless the nature of the ground is such that it can be entered directly from the rear without going down steps, the building would be, on the whole, better without it, as a cellar produces complications of drainage and provides a place in which rubbish and filth are apt to accumulate, while it offers few tangible advantages.

It is a common mistake to build a stable too low. The main story should not be less than 11 feet in the clear height, and the front door, which should be hung on the inside rather than on the out, should extend to within 6 inches of the ceiling and be not less than 10 feet wide. As commonly arranged, a gable is built over the main entrance, with a door surmounted by a ring to permit of a snatch-block being suspended to hoist bags of grain and bales of hay into the loft from a loaded wagon which would be standing underneath in the doorway. A better arrangement is to leave a large trap in the loft floor and build a ring in the roof timbers immediately overhead, so the loaded wagon can drive wholly into the barn and rest on the level surface while the grain or hay is being hoisted to the loft.

A stable of the ordinary type comprises four distinct parts, namely: a carriage-room entered directly from out-of-doors, wherein the teams are harnessed or hitched and carriages washed and put away; a harness-room, where harnesses are hung and cleaned; a stall room, where horses sleep, feed and are groomed; and a loft, for storing fodder, a portion of the loft usually being partitioned off as a man's room.

A statement of the various items to be considered in connection with each portion of the stable is as follows:

Carriage-room.

- Strength of floor.
- Construction of floor.
- Area.
- Disposition.
- Heat.
- Wheel-guards.
- Carriage-wash.
- Trough.
- Hose-rack.
- Hot water.
- Sponge-rack.
- Chamois-holder and wringer.
- Overhead hitch.
- Whip-tree.
- Blanket-bars.
- Carriage-pole hooks.
- Cupboard.
- Finish.
- Hardware.

Harness-room.

- Disposition.
- Cases.
- Drawers and bit-case.
- Harness-hooks.
- Saddle-hooks.
- Sink and hook and grip for cleaning harness.
- Stove.

Stall-room.

- Disposition.
- Floor.
- Sizes.
- Arrangement and sizes of stalls.
- Varieties of stalls.
- Box-stall.
- Mangers.
- Ironwork.
- Hitchings.
- Cribbing.
- Gutters.
- Drains.
- Ventilation.
- Light.
- Heat.
- Windows.
- Hay feed.
- Grain-chutes.
- Blanket-bars.
- Sponge-rack.
- Implement-holder.
- Medicine-box.
- Finish.
- Paddock.
- Drying bedding.
- Manure-box.

Loft.

- Double floor.
- Stairs.
- Dimensions.
- Bins.
- Hoist.
- Blanket-bars.
- Man's room.

All the foregoing have to be considered in the construction of even the simplest stable and they are all essential to a well-ordered arrangement.

Carriage-room. — The Boston building-laws prescribe a strength of 70 pounds per foot for stable floors. This is hardly sufficient to give the desired stiffness. 2″ x 12″ spruce beams spaced 12″ on centres with bearings of about 16 feet would give a construction which would theoretically be in excess of the needed resistance, but the price of the extra lumber over what is strictly required by law would be so slight that the extra rigidity of the floor would more than compensate for the cost. In arranging a carriage-room, it is customary to allow for a space at least 10 feet wide across one side leading from the entrance doorway at the front to the carriage-wash at the rear, this space being left for driving in, hitching, etc., space for storage of carriages being provided at one side. 7′ x 14′ is enough to allow for each carriage; so that to accommodate four carriages the room should have an area of about 28′ x 24′. This is a minimum; 12 feet for driving in and 16 to 18 feet for carriages is better, making the carriage-room 28′ x 30′. This space should be entirely unobstructed by posts, the loft above being trussed in the roof through the centre. A moderate amount of heat should be supplied for a room of this size. Hot-water circulation from the heater in the harness-room is usually the most convenient source of supply, and if the required heat is no more than sufficient to prevent the water from freezing, a heating surface of 30 or 40 square feet would accomplish this purpose in our climate. It is, however, often desirable to keep the carriage-room comfortable in extreme weather, in which case there should be not less than 100 feet of surface. This is a matter of convenience and comfort, however, rather than necessity. For light, a single gas or electric bracket over the water-trough is sufficient.

A cast or wrought iron guard should be placed at each side of the front door. In its simplest form this consists of a piece of 2½″ steam-pipe bent in a quadrant to a radius of 8 inches, with flanges at each end screwed to the door-sill and jamb. If the stable is at all likely to be entered by heavy teams it is well, also, to screw a 6-foot length of 3″ x 3″ x ½″ angle-iron to the outer edges of the door-jambs. Wheel-guards consisting of a 2″ x 4″ strip, planed, should be nailed to the floor around the three sides of the storage-space at a distance of 8 inches from the wall to prevent the carriage hubs from scratching the sheathing.

The main floor of the stable is usually laid with an ordinary upper and under floor, the upper floor being matched and of hard pine where expense need not be considered, though a good spruce floor will answer every purpose.

If the framing of the floor is quite light, the timbers of the carriage-wash will have to be framed below the main timbers and then furred up so that the finished floor shall pitch 2 inches all around towards the centre. If 2″ x 12″ beams are used, however, they can be cut down 2 inches without materially impairing their stiffness. There are several methods of laying a floor for a carriage-wash. The simplest is to carry upper and under floor boards straight across the wash without any butt joints, springing the boards to fit the pitches of the wash, and putting a strainer and bell-trap at the centre connected with the drain from trough either to a cesspool or the drain to sewer. If there is a cellar under the stable, however, this floor would have to be made water-tight, in which case a ⅞″ matched spruce floor is first laid, mitred at the corners to fit the slopes of the wash. This is then covered with two thicknesses of tarred paper, and mopped with hot tar, and a flooring of 1½″ square-edged pine is laid with ⅜″ open joints running towards the centre, caulked with oakum run in hot tar or mastic composition. On top of this is laid a wearing floor of 1½″ x 5″ hard-pine strips laid ½″ open with joints pitching to the centre. At the centre an iron catch-basin is set-in flush with the floor. An iron box 12 inches square and 6 inches deep, covered with a movable iron grating and with the 3″ outlet carried up in the centre like a stand-pipe waste to within 1 inch of the grating, is very commonly used for this purpose, the sand from the carriage washing into the bottom of the box, while the water overflows into the waste-pipe, which should be not less than 3 inches in diameter. An improvement on this is shown by Figure 1. A wooden carriage-wash floor seems generally to be preferred on account of the better footing it affords, but a wash is often constructed of asphalt laid with a corrugated surface either over the wooden floor-beams, or, better, upon brick arches carried by iron beams. The asphalt is often laid only one inch thick. This is not enough; it should be at least two. Only the best natural-rock asphalt is suitable for this purpose, as the coal-tar products speedily wear out and do not keep tight. The size of the carriage-wash should be not less than 10′ x 14′, and as much larger as the conditions will admit, up to 18 or 20 feet square.

Troughs are very commonly built of 1½″ pine plank with white lead in the joints, but such are not altogether satisfactory. If the wood is lined with tinned copper it is several degrees better, but there are forms of enamelled cast-iron watering-troughs made especially for stables which are very satisfactory and cost from five dollars upward. A minimum size would be 22″ x 18″ and 12″ deep.

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The trough should be so located that as the carriage is driven into the stable the horse can go directly to the trough, being at the same time as near the carriage-wash as possible, and where practicable it is well to extend the wash so as to run entirely under the trough and catch the drippings therefrom. The trough should be enamelled inside and out, should set up on legs so as to be entirely open underneath, and should be supplied with both cold and hot water, the latter being taken from the circulation-pipe of the hot-water heating-coil. The sponge-rack and chamois-holder should be immediately above the trough, and on one side there should be a space for a cupboard arranged to receive a 50′ length of hose. There should also be close at hand a cupboard of sufficient size to receive odds and ends with a number of heavy hooks, and possibly in this same closet should be placed the racks in which the whips are to hang. There are several forms of holders arranged for one, two or three blanket-bars. These should be attached to the wall convenient to the space where the horse is to be unhitched and should be as long as possible, but not less than 6 feet, so that the blankets can be spread out without folding. On one of the side walls there should be two heavy hooks to support a carriage-pole.

In the cheapest stables the wall studding and the beams are left unfinished. If any finish is to be used, it should be of North Carolina or Georgia hard pine with three coats throughout of best spar varnish. All the hardware of every description used about the stable, rings, bolts, latches, etc., should be of bronze metal. The cost is considerably more than iron, though not a great deal more in proportion to the expense of the whole stable, and iron speedily rusts and does not give good satisfaction.

Harness-room. — A very common arrangement in stables is to have the main front door built with a wicket in it, which can be opened when the main door is closed, the harness-room in that case being entered directly from the carriage-room. A better plan is to build the main front door solid, with the harness-room so placed that it can be entered directly from out of doors. A wicket in a large door is apt to get out of order and give trouble, and there are many cases where it is desirable to enter the harness-room without necessarily going into the stable, so that on cold days the harness-room, which is always more or less warm, can be accessible without dissipating the slight amount of heat in the carriage-room. The harness-room must be entirely separated from the stall-room, otherwise the ammonia fumes from the stalls are apt to make havoc with the harness and trimmings. The size of the harness-room depends entirely on the accommodation required for harnesses, but a good minimum size would be, say, 7′ x 11′. Harness-cases should have sliding glass fronts, should be 18 inches deep inside and provided with rows of hooks not less than 8 inches apart and placed 7 feet above the bottom, which should be set up 4 inches above the floor. If saddles are to be taken care of, the cases therefor should be not less than 24 inches deep. In some portion of the harness-room there should be a chest of four drawers, each about 6 inches deep, over which there can be a bit-case about 2′ x 4′ on the face and 9 inches deep, with glass doors. Inside there should be a dozen small brass hooks.

Ordinarily the watering-trough in the carriage-room is the only source of water-supply in a stable, but where strict economy is not required it is very advisable to install in the harness-room a sink about 30″ x 48″ and, say, 12″ deep. This should be set up on legs 30″ from the floor and should have a wide drip-tray all around, being supplied with both hot and cold water. It is a very good idea to have a wooden slat cover hinged to the wall to fold down over this sink, to be used as a table when the sink is not in use. Over the sink should be a hook and grip to hold the harness while it is being cleaned, arranged so it can be raised or lowered to get at any portion of the work desired. In case such a sink is installed in the harness-room it is desirable to have, close at hand, a sponge and soap rack. In some of the more recent stables, the harness sink, etc., is placed in a separate room about 8′ x 10′, immediately adjoining the harness-room proper, which in such case is simply fitted with harness-hooks on the walls, the cases not being required. It is hardly necessary to add that the harness-room should be abundantly lighted and the walls and ceiling should be sheathed throughout, even if the sheathing is omitted everywhere else in the stable. A single drop-light in the centre serves best for artificial illumination.

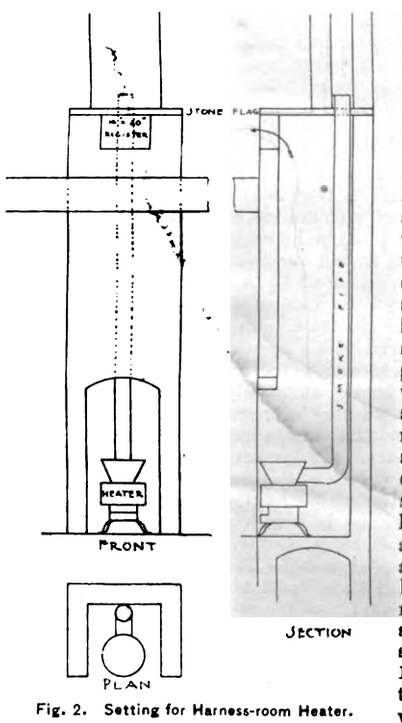


Fig. 2. Setting for Harness-room Heater.

The heater for the entire stable, unless it is a very extended structure, can be best located in the harness-room. Figure 2 shows an arrangement of heater, etc., which has been found very satisfactory in practice. The stove, or heater, is set in a recess 30 inches square, formed by 8″ brick walls on the sides and back, and open in front, the hearth also being of brick, though this need not be carried out beyond the line of the brick walls. At a height of 5 feet above the floor, the front of the recess is closed-in by an arch and the 8″ brick wall carried up on all four sides to a height of about 2 feet above the loft floor, where the space is topped off by a horizontal stone flag with a hole cut in the centre. Just below this in one side of the brickwork can be set a register. The smoke-pipe from the heater is carried up inside of the brickwork and through the stone flag above to second floor, where it terminates, the brickwork above this point being narrowed down to the dimensions of an ordinary flue and carried out through the roof. The radiation from the heater is amply sufficient to heat the harness-room and enough surplus heat goes up in the brick recess and from the smoke-pipe to supply heat for the man's room in the loft, the heat escaping through the register in the brickwork just above the floor. This arrangement is absolutely safe from any danger of conflagration, as the heater is entirely enclosed by brick and by no possibility of carelessness or accident could it set fire to the building. For an ordinary stable covering, say, 1,000 square feet, the equivalent of a No. 1 Walker-Pratt heater would be sufficient to take the chill off the carriage-room and keep the water in the trough from freezing. If desired to raise temperature up to 60 or 70 degrees in zero weather, a much larger heater would be required. The cost of a No. 1 heater installed with the necessary piping, including the branch outlets to the trough in the carriage-room and a washing-sink in harness-room would be about $125.

C. H. BLACKALL.

[To be continued.]

CONSTRUCTION IN EARTHQUAKE COUNTRIES.[1]

SINCE time immemorial, buildings have been tied together with iron or with wooden rods; but some time previous to 1868, when San Francisco was shaken, a patent known as the "Foye patent" was taken out to improve the construction of sea-walls. This was made to apply to land structures. The City-hall and other buildings in San Francisco are built upon this plan, which consists in tying together the walls at each floor by transverse and fore-and-aft rods of steel or iron. A plan similar to this is that of M. J. Lescasse.[2] It has been applied to several buildings in Tokio and Yokohama.

For such earthquakes as these buildings have experienced, excepting on one occasion, when the chimneys of the German Hospital in Yokohama were more or less injured, they have stood well. This system, however, requires to be thoroughly executed; for if the rods be too few, or if the bearing-surfaces be too small, rather than support a building they accelerate its destruction, especially at the points of contact. Such buildings, partly for this reason and partly on account of their expense, are not looked upon with favor in Italy. The Ischian law specifies that if iron bands or chains are used, they must act upon a large surface.

The Tokio disturbance of June 20, 1894, which produced disastrous results amongst very many ordinary European buildings, does not appear to have produced any visible effects upon several buildings in which the Lescasse system had been adopted.

Instead of tying a building together until it may have a rigidity which may be likened to a steel box, the builder may go to the opposite extreme, giving all his connections so much freedom that each part of the structure may be capable of yielding in the same manner as a wicker basket. That temple roofs in Japan probably stand in consequence of the freedom existing between them and the supporting walls has already been pointed out, and there is no doubt that Japanese dwellings owe much of their security to the freedom with which they yield. Their weakness chiefly resides in their heavy roofs, and the reckless manner in which main supports are cut away at joints with other timbers.

After the earthquake of 1893, the visitor to the provinces of Mino and Owara saw illustrations of destructions due to the failure of vertical supports in the apparently triangularly-formed thatched roofs of the farmers' houses, which dotted the country in all directions, looking like so many huge saddles. With lighter superstructures and iron straps or sockets to take the place of many mortises and tenons, there is but little doubt but that the destruction of life and property would be mitigated.

An excellent example of a large and handsome building put up on these principles is seen in the Imperial Hotel in Tokio, which, amongst its other attractions, is advertised as being earthquake-proof. Although it would be exceedingly difficult to demolish such a structure by shaking, its easy yielding results in so much internal disfigurement by the cracks in plaster and the falling of portions of ceilings and the like, that its advantages are somewhat marred; guests may be needlessly alarmed, and the building lose its reputation.

When building to obtain rigidity, much may be done by paying

[1] Extract from a paper in the *Engineer* by John Milne, F. R. S.
[2] "*Mémoires de la Société des Ingénieurs Civils*," 1887, page 212.

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attention to the floors. The beams supporting one floor should be placed at right angles to those on the floors above and below, and all should extend nearly, if not completely, through the supporting wall. Floor joists should similarly be well supported at their extremities, and, if possible, cross each other at right angles, while the flooring should be laid diagonally. Experience has shown how much destruction has been occasioned by the withdrawals of beams and joists from their supports, and both in the Ischian and Nortian edicts relating to these matters the construction of floors receives special attention.

An ordinary arch is undoubtedly stable for vertically applied forces, but for horizontal stresses it is one of the most unstable structures that could be erected; and because it has so often been the cause of ruin when shaken by an earthquake, in Italy and Manila special rules have been drawn up respecting such structures. Thus, in Manila intersecting vaults are not allowed and ordinary vaults are only permissible when strengthened in a particular manner by iron. In Liguria vaults can only be used in cellars, and even there the rise must be at least one-third of the span. The law of Norcia, also, only permits the use of arches in cellars, and their thickness and the method of construction are defined. In Ischia, archwork with a rise of one-third of the span, and with a thickness of .26 metre at the crown, may be used, but only in cellars. Speaking generally, the use of archwork above ground has been prohibited, and if it has existed after an earthquake, all Governments who have paid attention to building have ordered its removal. Underground its use is permitted, providing that the arches are not too flat. This, however, only tells us that the motion beneath the surface is too small to destroy even a bad form of structure, and, therefore, such a form of structure, providing it is underground, is allowable.

If it is a necessity that arches must exist, they should not be too flat; they should have a specified thickness, be protected by an iron or wooden beam above, and curve into their abutments. Arches which meet their abutments at an angle often show cracks at their junction, and these may have been formed by very slight shakings. Light arches connecting heavy walls, or arches for porticos, supported on one side by a building and on the other by a column, often give way. Wing walls, such as support an embankment and form an entrance to a subway beneath a railway, as usually constructed, seem to be especially weak.

In 1891, in Mino and Owari, the writer does not remember having seen a single wing wall which had not separated along a vertical line from the abutments of the bridge.

In the building regulations for Norcia and Ischia it is stated that openings should be placed vertically above each other. It appears to the writer that if we have a series of openings like doors and windows in a wall, placed vertically above each other, it is very much the same as if we had here and there built our wall with the joints of a line of bricks or stone continuously above each other — that is to say, we have destroyed the uniformity of the wall by lines of weakness which will readily give way to horizontally applied stresses.

Although the subject may not be one of great importance for ordinary dwellings, the writer inclines to the opinion that the doors and windows in successive tiers of openings ought *not* to be above each other, but so far as possible arranged that any line of openings, when regarded vertically, is as much broken as possible.

After an earthquake it certainly happens that we often meet with buildings which have been disfigured by lines of cracks running vertically downwards from window to window, these openings having performed a similar function to the perforations in a sheet of postage stamps. To arrange doors and windows so that they may form ready means of escape is certainly a matter worthy of attention. An important point mentioned in the Ischian law is the position of doors and windows relatively to the freely vibrating end of a building, the limiting distance being 1.50 metres. Similar regulations are found in the regulations for Norcia and Liguria. This distance should, if possible, be made to depend upon the materials of which a wall may be constructed, its dimensions, and the size of the openings.

A terrible destruction of life has often happened in consequence of the openings on one side of a row of houses, as, for example, in shop fronts facing a street, having been much greater than those in the opposite side. This is particularly marked in Japan, where, no matter from which side the shaking may approach, the tendency of the buildings is to yield on their weakest side and fall inwards upon the streets. If these are narrow, the débris from the two sides forms an embankment down the middle, beneath which the inhabitants seeking refuge from their houses are entombed.

In Ischia it was suggested that balconies should not project more than .60 metre beyond the wall, and should be so constructed that they formed a part of the wall. The regulations provide that cornices should not project more than .30 metre beyond a wall. From the Ligurian regulations we learn that cornices shall not project beyond the thickness of the wall to which they are attached, while roofs may not rest upon them. Stone consoles must run through the wall to which they are attached. In Manila the regulations require that the balconies rest on the prolongation of timbers of the upper floor. Otherwise a special form of construction is required. From what I saw of the balconies or upper verandas when in Manila, it appeared that many of them were without support on their outer sides. In such instances they act as loaded cantilevers, which, either for horizontal or vertical motions of the building, must cause considerable stress at their points of junction with the supporting wall. A careful examination of several hundreds of brick houses in Tokio showed that the walls were usually cracked at the points where they were entered by the beams supporting a balcony, notwithstanding the fact that the same balconies were supported along their outer face by vertical pillars rising from the ground. My own opinion is that balconies in any form are objectionable features in a building constructed to withstand earthquakes.

Walls which are run upwards beyond the height of those carrying the main roof to form gables, especially when they support a heavy coping, although not referred to in regulations, are, from the author's own observations, exceedingly objectionable features in a building, usually falling outwards to destroy and bury porticos, or whatever may be beneath them.

Staircases are also overlooked in regulations; if heavy and supported from the walls these may have the same destructive cantilever action that is found in balconies. Ceilings, we learn, should be constructed in the ordinary manner with laths and plaster. The author's own observations suggest that this is by no means sufficient. The latter should be well secured, and the plaster be especially adhesive. Heavy ornamentation should be avoided. Although persons are not likely to be killed by the coming down of a few pieces of plaster, the cracking and falling of it creates so much disfigurement and alarm, that even a building which has been constructed to be earthquake-proof may receive a bad name, and those who have a choice in the matter decline to live in the same. For a large hotel the falling of plaster may mean financial ruin.

This section, relating to the quality of materials which ought to be employed when building in earthquake countries, is one which cannot be too greatly emphasized.

All regulations relating to this matter insist that materials of good quality shall be used.

The Ischian regulations specify that for the principal framework of buildings, chestnut must be used. In all cases squared stones are to be employed. The lime must be good, and be properly slaked with fresh water. Below ground, hydraulic mortar must be used, and the sand for the mortar must be clean. These matters are treated upon in all regulations. In the regulations for Manila there are special remarks condemning the use of liquid lime, and recommending that stone walls shall be kept wet while the mortar is setting, also that there shall be a good bonding, etc.

After the disaster of 1891, the author had occasion to test the tensile strength of very many samples of masonry collected from the ruins throughout the earthquake district. In some instances the brickwork used in certain buildings was held together by a material which, although it looked like mortar, was so non-adhesive that the bricks could be easily separated by hand. The tensile strength of this material was too low to be measurable. In Tokio the writer saw a tall chimney and a wall built with what appeared to be a similar material, which were overturned by a high wind. The strength of other samples varied between three pounds and fifteen pounds per square inch. When a brickwork structure is shattered, it will be noticed that either the cementing material has yielded, that it is separated at its junction with the bricks, or the bricks themselves have fractured, from which it follows that there has been a want in uniformity of strength throughout the building.

To obtain economically the uniformity which is desirable, it would seem that the strength and adhesiveness of a cementing material should be approximately equal to the strength of the material it is intended to hold together, or, especially for the higher parts of a building, it should at least have a resistance equal to the effects of the tensile strain it is expected it may have to resist. To economize the use of cement in Japan, bricks which lock into each other have been made, while hollow bricks have been employed to avoid effects due to inertia. In the preceding sections reference has been made to the use of adhesive materials in embankments, the use of iron sockets and straps to avoid excessive cutting in timber joints, the untrustworthiness of cast-iron in columnar structures, and the effects of heavy materials for roofs. In choosing materials to resist earthquake effects, one rule is to take those which give a maximum strength with a minimum weight, and this especially for superstructures. For example, it would seem that a wall made of pumiceous scoriæ and cement would be lighter than one where the cemented basis was ordinary gravel.

The type of building most suitable for earthquake countries was discussed at considerable length by the Commission summoned after the disaster in Ischia.

The objections to iron buildings chiefly rested in their cost, the difficulty of keeping them cool, and the fact that as they were a novelty it might be difficult to get them generally accepted. The Commission, however, considered them durable and secure, and recommended that experimental buildings should be erected.

Timber buildings, although sufficiently strong and elastic to resist earthquake motion, and at the same time fairly impervious to heat, have the objection that they are not durable, and are subject to fire. These objections may to some extent be overcome by the proper application of paints, chemical preservatives, and the so-called earthquake lamps, which are put out if overturned. Mixed constructions of iron and timber were not considered to present great advantages over those wholly made of timber. Buildings may be made of iron or masonry either by covering an iron framework with stone or

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brick, by building an iron framework inside the masonry walls, or by filling up the spaces between a double metallic framework with hollow bricks or other materials. Such buildings, although exceedingly good from many points-of-view, have the drawback that they are exceedingly expensive.

Having considered these types, from which it will be observed ordinary buildings of brick and masonry have been excluded, the committee describe a "barrack system" of building, which is the system they particularly recommend for Ischia. Briefly, such a building consists of a timber framework well braced together, the spaces between the timbers being filled up with hollow bricks or some light material like scoriæ. The timbering is hidden by rough-cast. After the disaster in 1755 such a system was made compulsory in Portugal. A building of this type, which may be made ornamental with an outside covering of tiles, which the author, however, does not think is to be recommended, is cheap, impervious to heat, and safe against earthquakes and fires. This suggestion respecting the system of construction was adopted in the regulations issued by the Italian Government.

In the building regulations for Norcia the barrack system is the one to which preference is given. In the Manila regulations considerable latitude is allowed as to the system of construction. Stone walls are considered best, but concrete or brick are also considered good. Although timber offers great resistance to earthquakes, its destructibility by fire, white ants, ordinary rot, and its inability to exclude heat prevent its recommendation. An iron framework filled-in with concrete is spoken of with favor. In the recommendations of a committee appointed to consider building in Manila, we find that stone is recommended for the basement and for the walls of the ground floor. This, with an upper story of timber, is the type of building which is common in Manila.

The military committee which was summoned in connection with the destruction in Manila, in 1863, pointed out that destruction had occurred in all classes of buildings, but buildings with masonry supports had suffered more than others. This led them to suggest that only one kind of material should be used in constructions, and masonry supports should be avoided. Private buildings should be of wood. In all cases the limiting spans of roofs were specified, and the roofs must be light. Lieut.-Colonel Cortés, who wrote at some length on structures in earthquake countries, shows that buildings must be light as well as strong, and this may be obtained by building their parts together much in the same manner that the timbers of a ship are bound together. Foundations and walls should be continuous. Timberwork and masonry should not come in contact, otherwise they may be mutually destructive.

After criticising the system of building in Manila, and showing how it may be improved, especially with regard to balconies and roofs, Colonel Cortés proposes as a foundation a timber platform almost on the surface of the ground, from which rises a building with iron or timber framing footed on a plinth of masonry, surmounted by a light roof. The wall-framing may be filled with brick or plaster. Colonel Cortés's descriptions are accompanied by an elaborate series of illustrations.

The Californian system of construction, for which a patent has been granted, as we have said, appears to be very similar to that proposed by M. Lescasse, the essential feature in which is to tie a masonry construction together at each story by a set of iron or steel rods, which run from end to end, and from back to front in the interior of the walls of a building. There are also rods running vertically.

From South America but little information has been obtained. In Columbia the smaller houses have been built of thick adobe bricks, while the Spanish have used stone.

In Equador (Quito) occasionally a special earthquake-proof room is built, the walls of which are a wooden framework filled-in with adobe. Many houses which have adobe walls three feet thick have only one story, and there are few houses with more than one upper story.

In Venezuela, also, the houses are low. In Mexico and Bolivia the houses are solidly built; while in Lima certain buildings are constructed lightly so that they may yield.

From Guatemala (San Salvador) I received from Messrs. Clark & Co., contractors, the drawing of a house supposed to be earthquake-proof. It is of timber, well framed together, and very similar to the bungalows in Japan. These latter descriptions are particularly meagre, and for a full description of the system to which they refer it is better to refer to Vol. XIV of the "*Transactions Seis. Society of Japan.*"

If we wish to mitigate the effects of earthquakes, one general conclusion that may be drawn from what has been written is, that it is essential to select a site where we know from experience and experiment that the ground suffers but slight motion. This will generally be the hard ground, which is usually the high ground. Soft ground, slopes and scarps should be avoided. Having obtained our site, we can follow one of two general systems of construction — either to give so much rigidity to a structure that it may be likened to a steel box, or to erect a building which is light, but which has so much flexibility that it may be compared to a wicker basket — in either of these structures we ought to have lightness, especially in their upper parts.

Amongst the former class of buildings, which, from the materials of which they are constructed, are unquestionably heavy, we have ordinary structures of a stone or brick (by preference we might use hollow bricks). These should rise from a deep foundation, have a free basement, walls of unusual thickness, and be well bonded and tied together. The roofs should be light, and the precautions respecting the position and form of openings, the arrangement of floors, roof-trusses and top weight referred to in the preceding epitome carefully attended to. In this case we have a building where its strength more than outweighs the ill effects due to its weight. Such buildings are durable, relatively safe against fire; they are suitable for all climates, but they are relatively to all other buildings very expensive.

For this latter reason this type of structure can only be employed for buildings of importance.

Amongst the light buildings, which have sufficient strength and flexibility to overcome the effects due to their own inertia when shaken by an earthquake, are nearly all well-constructed structures of wood or iron. The former of these, however, is neither durable, safe against fire, nor impervious to heat and cold. These objections may, however, be practically overcome, and wooden buildings are cheap. Iron buildings are relatively expensive, and without special arrangements they are too hot in summer, and too cold in winter.

A type of building which offers the same advantages as a brick or stone structure does in relation to the danger of fire, and in being suitable for changes in temperature, but which is very much cheaper, and at the same time safe against all ordinary earthquakes, is a building constructed on the barrack system, so strongly recommended in Italy. The framing may be of wood or iron, while the filling-in material which forms the walls, which ought to be as light as possible, may consist of hollow bricks or a concrete of light material. For this latter purpose in Japan experiments might be made with a concrete made of the pumiceous light scoriæ, of which in Japan there is such an abundance. I would also call attention to the possible employment of cylindrically-formed or drain-pipe-shaped bricks, such forms being stronger than bricks of the ordinary rectangular section.

In all these buildings, whether they be of masonry, iron, wood, or built according to the barrack system, the roofs must be light, openings must be in proper positions, walls must be of moderate height, while floors, trusses, balconies and the like must be constructed in accordance with the suggestions contained in the previous epitome. Ordinary structures in bricks or stone are usually bad, while timber structures with a masonry front are worse. To resist earthquake motion we require lightness, strength, and, if possible, a certain elasticity. Weight, unless it is accompanied by great strength, should be avoided.

For buildings of importance I suggest the use of masonry. Let the buildings be placed in good situations, the brick or stonework well bonded and unusually thick, and let it rise from deep foundations. Roofs should be light. For ordinary buildings, unless the barrack system be adopted, I suggest that for a country like Japan, ordinary frame buildings continue to be used. To improve them they require more diagonal bracing, less cutting at the joints, lighter roofs and some protecting covering against fire. In carrying out these suggestions, the conclusions respecting general principles and details of construction arrived at in the preceding epitome must not be overlooked.

A type of structure, several examples of which are springing up in Tokio, and which embody several principles promising to render them less liable to destruction than ordinary dwellings, has been recently designed and patented by Mr. Inouyé, a private architect. The main feature is that of a roof, the principal rafters of which are carried downwards to a sole-plate on the ground. Rather than weakening timber by mortises and other joints, cast-iron sockets and a variety of iron straps are employed. A veranda gives the appearance of walls, and the roof, which is of wood, is covered with paint and sand. When completed these buildings have a villa-like and pleasing appearance, and in the writer's opinion will stand whilst ordinary buildings will fall.

BOOKS AND PAPERS.

WE do not, in these days of complex and specialized construction, particularly favor the use of model specifications, at least for anything but ordinary dwelling-houses; but, while it is no longer prudent to use a stock form of specification, with a few interlineations to adapt it to different buildings, it has become more desirable than ever for the architect to have at hand something in the shape of a reminder, by reference to which he can fill the gaps in his first draught of a specification, and carry into more detail stipulations which are not sufficiently full. In this book,[1] the latest of any importance which has come under our observation, Mr. Bower has appreciated the conditions which his work should fulfil, and has performed a valuable service to the profession by the pains which he has taken to collect from various sources the collateral information which the modern specification-writer most needs. In fact, the collateral information is in some respects the best part, as

[1] "*Specifications: A Practical System for Writing Specifications for Buildings.*" W. Frank Bower. New York: Edward A. McLean, 14 Lafayette Place, 1896. Price, $5.

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it was probably intended to be. For example, the specification for Hot-water Heating consists of twenty-two lines, exclusive of the contractor's guaranty and the references to the Steam-Heating specification; but with it is given a much larger amount of useful suggestions, which might with advantage have been still further expanded. In the same way, the Plumber's specification, which is good, though too short, is mixed with what should be the Gas-fitter's specification, in a way which is, we think, peculiar to New York, and is not particularly worthy of imitation; but some tables of weights of pipe, and suggestions of various sorts, are added on the alternate pages, which will be found very useful. As an *excursus* to the Electrical specification, which is full and good, the Standard Rules of the National Electric Light Association, adopted in 1894, are printed complete; and many quotations from the New York Building Law, and tables of weights, snow and wind-loads, strength of cement, and so on, are given in appropriate places. Mr. Bower has in these tables and elsewhere, perhaps necessarily, referred to one or two selected types of the materials mentioned, and architects of experience would, perhaps, be glad to see a more comprehensive presentation of the subject; but it would have increased materially the size of the book to give anything like a comparative description of the various available cements, varnishes, steam and hot-water boilers, etc., and the necessary information for such comparisons is easily obtained elsewhere.

MOST old architects and builders probably retain a grateful remembrance of the works of Peter Nicholson, Batty Langley, Gwilt and others, who, in the days when architects were little employed, endeavored to put into the hands of persons interested in building, some rational information in regard to the principles of design and construction. The first book of the kind that came into our own hands had, in a modest way, a rather interesting history. One of our uncles, who flourished in the middle portion of the present century, was treasurer, if we recollect rightly, of the first cotton-manufacturing corporation formed in Massachusetts. It fell to his lot to arrange for the construction of a mill for the corporation, at Lowell, and, with characteristic conscientiousness, wishing to have everything about the new building as perfect as science could make it, he sent to England for a copy of Peter Nicholson's "*Dictionary of Architecture*," in two bulky volumes, from which he sought to imbibe the information necessary for planning and supervising the work intelligently. These two volumes came, many years afterwards, into our youthful hands, and for a long time formed the basis of our professional knowledge. Now, although the modern architect laughs at Nicholson's careful copper-plate engravings of the roof-trusses of Drury Lane Theatre, and his elevations of a house in the Grecian style, it is by no means certain that his theories of proportion in panelling and fenestration, and his suggestions, borrowed from Evelyn, on the use and seasoning of timber, have not still some value; and, if modern builders would condescend to read hand-books, it is very possible that one might still be written which would tell them something that they do not already know.

Such a hand-book Herr Lothar Abel has endeavored to prepare for German builders. As he modestly says in his preface, the present is, above all, the practical age. Nevertheless, it is possible for even a practical builder to exercise a certain discrimination in the planning of his houses, and in the choice of a style for their design, and some suggestions which may aid in exercising this discrimination wisely are not amiss in a book which is devoted more particularly to details of construction.

With this idea, in connection with chapters on Foundations, Building Materials and Building Operations, Static Calculations, and Estimates, he gives an essay on House-Planning, including dwellings of different sorts, from the workingman's cottage to the nobleman's palace, including farm-houses, parsonages, country mansions and city apartment-houses; and, a little farther on, is a chapter on architectural form and proportion, as applied to the designing of openings, the arrangement of heights of stories, and decoration in general, followed by an abstract of the principal architectural styles, from the Egyptian to the modern Renaissance, which occupies sixty pages, and is illustrated by fifty-eight admirably chosen wood-cuts.

Although the whole book is characterized by the skilful condensation which only a thorough master of his subject can apply to such matters, it is in the chapters on æsthetic matters that professional readers will find this quality most striking. The chapter on Architectural Design and Proportion, for instance, is filled with rules, given, as they should be for such a purpose, without discussing their origin or propriety, some of which will, we imagine, be new, even to architects, although the author speaks of them merely as "simple and natural principles, which assist in giving a harmonious appearance to the outside of buildings, or, at least, in avoiding an air of unskilful vulgarity." Among these rules, which, by the way, are illustrated almost exclusively by French examples, we find the familiar maxim that horizontal bands make a surface look low and long, while vertical members make it appear narrow and high; followed by a rule that, in a building standing alone, no vertical wall-surface should extend in length more than three times its height, without being broken by recesses or projections. This rule, which is a novelty to us, would certainly admit of exceptions, which every architect will call to mind; but, for such structures as are designed by ordinary builders, it is likely to be of value. Speaking of fenestration, the familiar principle is given, that the openings should increase upward in size or number; but we find also an excellent suggestion, that where large openings in the first or second story are necessary, apparent solidity should be given to the lower walls in another way, by showing as deep reveals as possible.

In the chapter on Architectural History we find the same condensation. Speaking of the Romanesque style, we are told that it consists in general in semicircular groined vaults, with ribs, round-arched windows, round-arched frieze-arcades, picturesque grouping of parts, and the characteristic ornamentation, which is elsewhere described. With three or four illustrations, this gives an excellent definition of at least the German Romanesque, and there is a little further explanation of the progressive stages of the style. The Renaissance part is equally excellent, covering the field well and concisely, and architects who read German, as well as builders, will find the book, in general, interesting and valuable.

[1] "*Die Praxis des Baumeisters*": Ein Hilfsbuch bei allen Bauführungen von Wohnhäusern: von Lothar Abel, Architekt: Mit 106 Abbildungen. Wein, Pest, Leipzig: A. Hartleben's Verlag, 1896. 4 marks.

SOCIETIES

MINNESOTA CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE annual election of officers resulted as follows: *President*, Harry W. Jones, Minneapolis; *Vice-President*, Clarence H. Johnston, St. Paul; *Secretary* and *Treasurer*, Walter S. Pardee, Minneapolis; *Director*, one year, F. A. Clarke, Minneapolis; *Director*, two years, Cass Gilbert, St. Paul.

AMERICAN INSTITUTE OF ARCHITECTS.

THE Thirtieth Annual Convention will be held in the rooms of the Engineering Association of the South, at Nashville, Tenn., on Tuesday, Wednesday and Thursday, October 20, 21 and 22, 1896.

ORDER OF PROCEEDINGS. — TUESDAY, OCTOBER 20TH.

The members of the Institute will assemble promptly at 10 o'clock, A. M., will register their names, and at 10.30 the President of the Institute, Mr. George B. Post, of New York, will call the Convention to order, and an Address of Welcome, in behalf of the citizens of Nashville, will be given, which will be responded to by the President, in behalf of the Institute, followed by his Annual Address. Mr. William C. Smith, the Chairman of the Committee of Arrangements, will make an announcement of local arrangements, and the Convention will be declared open for business, in this order:

1. Report of the Board of Directors.
2. Report of the Treasurer and appointment of the Auditing Committee.
3. Reports of Chapters, a synopsis of which will be read by the Secretary.
4. Reports of Standing Committees:
   - Committee on Foreign Correspondence, W. L. B. Jenney, *Chairman.*
   - Committee on Education, Henry Van Brunt, *Chairman.*
   - Committee on Publication and Library, Frank Miles Day, *Chairman.*
   - Committee on Conservation of Public Buildings, R. M. Upjohn, *Chairman.*
   - Committee on Building-laws, T. M. Clark, *Chairman.*
5. Consideration of the Annual Address of the President, of the Report of the Board of Directors, and of the Reports of the Chapters and Standing Committees, followed by the appointment of the Special Committees to which recommendations contained therein shall be referred.
6. Reports of Special Committees:
   - Legislative Committee on Government Architecture, George B. Post, *Chairman.*
   - Committee on National Building for the Institute, Daniel H. Burnham, *Chairman.*
   - Committee on Papers read by Messrs. Patton and Cook at the St. Louis Convention, W. W. Clay, *Chairman.*
7. Consideration of Reports of Special Committees and action thereon.
8. Consideration of proposed amendment to the By-laws.

It is proposed that the morning and afternoon sessions shall be continuous, with the exception of a recess for luncheon from 12.30 to 2 P. M. The Committee of Arrangements will make announcements before recess.

There will be a Reception complimentary to the American Institute of Architects, at 8.30 P. M., at a place to be announced by the Chairman of the Committee of Arrangements.

WEDNESDAY, OCTOBER 21ST.

1. Deferred Reports of Special Committees.
2. The Committee on Education has arranged for a series of

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papers by Robert D. Andrews, F. A. I. A., Boston, Mass.; C. Francis Osborne, F. A. I. A., Ithaca, N. Y.; J. W. Yost, F. A. I. A., Columbus, Ohio; Dankmar Adler, F. A. I. A., Chicago, Ill.; N. C. Ricker, F. A. I. A., Urbana, Ill., and G. F. Newton, Boston, Mass., on "The Influence of Steel Construction and of Plate Glass on the Development of Modern Style."

It is intended that these papers shall be merely introductory to a general debate, in which it is hoped that Fellows will come prepared to participate.

3. Paper: "National Architecture," William Martin Aiken, F. A. I. A., *Supervising Architect of the United States Treasury Department.*

4. Appointing of Committees to nominate officers of the Institute for the ensuing year, and to suggest a place in which to hold the next annual convention.

5. Announcements by the Committee of Arrangements.

The morning and afternoon sessions, like those of Tuesday, will be continuous with the exception of a recess for luncheon from 12.30 to 2 P. M.

The evening is set apart for social intercourse between the visiting members of the Institute and the citizens of Nashville, the details of which will be made known by the Chairman of the Committee of Arrangements, on Wednesday, October 21st.

THURSDAY, OCTOBER 22D.

1. Reports of Committees and their consideration.

2. Mr. James B. Cook will propose to the Convention the feasibility of creating a Standing Committee on "Applied Arts and Sciences."

3. Unfinished business.

4. Election of officers, and selection of a place for the next annual convention.

5. Miscellaneous business.

6. Adjournment.

The afternoon will be reserved for a visit to the Tennessee Centennial and International Exposition Grounds, and such other places of interest as may be determined upon by the General Committee on Entertainment.

A banquet will be served at the Maxwell House, at 9 P. M., in honor of the American Institute of Architects.

ALFRED STONE, *Secretary, A. I. A.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

THE POSTAL-TELEGRAPH-CABLE CO.'S BUILDING, BROADWAY, NEW YORK, N. Y. MESSRS. GEO. EDW. HARDING & GOOCH, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print, issued with the International and Imperial Editions only.]

"THE CAPSTAN," FOR MESSRS. B. P. & C. P. CHENEY, MIDDLE BREWSTER'S ISLAND, BOSTON HARBOR. MR. J. A. FOX, ARCHITECT.

SKETCHES IN ECONOMY, O., BY MR. E. ELDON DEANE, NEW YORK, N. Y.

HOUSE AT CONCORD, MASS. MR. EUGENE L. CLARK, ARCHITECT, BOSTON, MASS.

HOUSE FOR MR. F. C. LIBBEY, MALDEN, MASS. MR. A. C. FERNALD, ARCHITECT, BOSTON, MASS.

[The following named illustrations may be found by reference to our advertising pages.]

HOUSE, NO. 4 VICOLO DEL CAMPANILE, ROME.

DETAILS OF SGRAFFITO WORK, NO. 4 VICOLO DEL CAMPANILE, ROME.

DETAILS OF SGRAFFITO WORK, NO. 4 VICOLO DEL CAMPANILE, ROME.

[Additional Illustrations in the International Edition.]

ENTRANCE TO THE POSTAL-TELEGRAPH-CABLE CO.'S BUILDING, BROADWAY, NEW YORK, N. Y. MESSRS. GEO. EDW. HARDING & GOOCH, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

GROUP OF DWELLING-HOUSES, DRESDEN, SAXONY. HERR ERNST BECHER, ARCHITECT.

THIS illustration is copied from *Architektonische Rundschau.*

E. U. CHURCH, BATHGATE, SCOTLAND. MR. J. GRAHAM FAIRLEY, ARCHITECT.

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THESE illustrations are copied from *La Construction Moderne.*

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CHURCH OF ST. DAVID, EXETER, ENG.

THIS illustration is copied from the *Builder.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A QUESTION OF COMMISSION.

ALTOONA, PA., September 25, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Kindly express an opinion on the following matter of commissions:

A firm of architects entered into contracts with the county commissioners to furnish plans, etc., and superintend the erection of the County Almshouse.

The regular charges of 5 per cent were to be paid and all matters were to be decided according to the usual custom of architects, as interpreted by the American Institute of Architects. The architects were instructed to provide for 450 inmates. The plans were completed *in detail*, the commissioners inspecting them during their progress; the plans were accepted and bids asked for; but just at this time it was discovered that a building accommodating but 200 inmates was all that was required. The architects were instructed to prepare an entirely different set of plans, which they did, the building being erected in accordance therewith and was entirely satisfactory to all concerned.

The architects were paid 5 per cent on the building, and claim 2½ per cent on the first set of plans which were worked-out in detail, they paying their own expenses while carrying on the work.

The commissioners do not object to the bill, but only wish to know what is just and proper. It is proper to state that the first building would have cost twice as much as the second, but was about the same ratio per inmate. The contention of the architects is this, that if the operation had been abandoned at the time the second set of plans were ordered, the charge would have been 3½ per cent and that the second set of plans was entirely a different operation.

Yours truly, C. M. ROBINSON, *Architect.*

[WE should say that the charge of 2½ per cent for the first set of plans was entirely fair and reasonable. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

ARCHÆOLOGICAL SURVEY IN MADRAS. — During 1897-1898 it is proposed that the Archæological Survey operations in Madras should embrace the most important monuments in the Tinnevelly district, many of which are of great interest. The number of places which it would be possible to visit is contingent to a great extent on the amount of work; to be ascertained after inspection. Among the chief remains of interest are those at Sattur, Sankaranayanakovil, Virasakamani, Kalugumalai, Kuttalam, Tenkasi, Korkai, Maramangalam, Srivaikuntam and the Valavanad Hill, consisting of temples, ancient city sites, rock-cut caves, monolithic temples, Jain sculptures and inscriptions, cairns, Siva and Vishnu temples, sepulchral and other remains. The most extensive work will be in the great Siva Temple in Tinnevelly town. Government has approved of the programme. — *Indian Engineering.*

THE WALL OF ANTONINUS. — The preservation of the remains of the famous wall of Antoninus between the Firths of Clyde and Forth, built in 140 A. D., has been occupying the attention of the National Trust for Places of Historic Interest or Natural Beauty. Communications have passed on the subject between the Trust and Lord Balfour of Burleigh, Secretary of State for Scotland, who has displayed considerable interest in the matter, and has visited the neighborhood of Falkirk in order to examine personally what remains of the wall. There is reason to believe that the landlords along the line of the wall will coöperate in the work of preservation. — *Invention.*

NEW MONUMENTS AT PERE LACHAISE. — Besides the great work by M. Bartholomé, the "Monument aux Morts," the cemetery of Père Lachaise is also to receive shortly another important work, the monument to be erected by the Paris Municipality to the memory of artisans who have been killed by accidents in the course of their work. This monument is to be carried out from the general designs of M. Dupré, the architect, but it will also include important sculptural work. — *The Builder.*

S. J. PARKHILL & Co., Printers, Boston, U. S. A.

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OCTOBER 17, 1896.

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IT is singular that, with a very good and detailed building-law, enforced by capable and honest officials, the City of New York is the scene of many accidents due to bad construction; and strangely enough, in the great German cities, particularly Berlin, where building-regulations are still stricter than with us, and are enforced by the police with the utmost strictness, such accidents are quite as common as in New York. The last catastrophe reported is the fall of a tenement-house in process of construction on Madison Avenue, after the walls had been carried up to the third story. One workman was killed by the fall, and eight injured. So far as can be judged by the accounts in the newspapers, the fall of the building was due simply to bad workmanship. The fact that the lot was sold at auction in June for $14,650, and in August was conveyed by the purchaser, subject to mortgages to the amount of $19,000, to another party, who obtained a building-loan for $12,000 more, suggests a sort of speculation which is becoming very common, and which does not conduce to sound construction. However this may have been, the work of building appears to have been carried on in the cheapest and poorest manner. The twelve-inch walls are reputed to have been made with two four-inch walls of good brick, filled-in with bats, and probably laid in inferior mortar. Every architect knows the behavior of this sort of wall under a load, and it is not surprising that it should have held out only to the third floor.

AS nearly all the accidents to new buildings which have occurred in New York are traceable to this method of constructing brick walls, it is becoming an important question whether there is any way of preventing such construction. Although, in the present case, the three inspectors of the Building Department in whose district the work was carried on were immediately suspended, it is not likely that they could have prevented the trouble. It is needless to say that no supervision, short of stationing an inspector at the elbow of every workman, can prevent bad workmanship. On an average, each of the Department Inspectors has about seventy buildings to look after, and it is, of course, impossible to watch details of workmanship, except so far as the results of bad work may be visible after its completion. Where, as in the case of a badly built wall, the defects are concealed as soon as the work is done, neither inspectors nor architects can guard against them, although they may, as in this, and many similar instances, be the cause of the ruin of the building and the loss of innocent lives. It has been proposed that the bricklayers', carpenters' and other unions should interest themselves in the matter of detecting and preventing bad workmanship, and some of them have done so to good effect; but it may be doubted whether the labor leaders generally have shown sufficient conscientiousness and good judgment to be entrusted with extensive powers in this direction. Probably the best way to better workmanship lies, for the present, in holding owners and contractors to strict liability for the acts or neglect of the people whom they employ. Every architect knows that many workmen are possessed with a sort of malicious instinct, which finds positive enjoyment in doing bad work surreptitiously. Some of these worthies, when employed directly by the day, and using materials furnished by themselves at a large profit, will use brick-bats, instead of good brick, in the interior of a wall; will shut up flues a few feet above the fireplace to which they belong, and will commit all sorts of similar mischief, apparently for the sole pleasure of betraying confidence, and doing secret injury Such workmen as these ought to be driven from the community without delay; and to hold their employers responsible for their acts is the most available method of identifying them, and either reforming or eliminating them. In the case of owners, while the moral responsibility for the employment of a bad contractor is not so evident as where a contractor employs a bad workman, it is reasonable to suppose that an owner should know something of the difference between an honest and responsible mechanic and the miserable thieves who go about underbidding the better men; and, if he chooses to employ a person who offers to do work for less than its value, in the hope of making a profit by robbing somebody, he ought to be held to a certain liability for the consequences, where these affect innocent parties.

THE Boston Art Commission has taken action this week in a very difficult matter, as it involved considerations of a very delicate nature, and we feel they deserve strong commendation for the decision they have reached. In declining to accept the statue of the Bacchante for the Public Library they were compelled to decline a piece of really artistic work and so run the risk of hurting the feelings of an artist of acknowledged ability and repute, while at the same time they certainly incurred the danger of wounding the *amour propre* of another artist, the architect of the Public Library itself, who desired to present this statue to the institution as a token of the great and well-sustained interest he felt in the work as a whole. Besides this, as the French Government had so high an appreciation of the artistic qualities of the Bacchante that they had ordered a replica of it for the Luxembourg, the Boston officials had to set their opinions against a verdict of some weight that had already been rendered. The decision we feel is wholly righteous, since to accept MacMonnies's statue for the particular site in question, where it would be the central feature of the court-yard, would offend every principle of appropriateness, suitability and decency. Probably whatever discussion may ensue will centre about the propriety of placing a nude female figure in a public place, but to our mind this is the least important consideration. It is not so much to the impropriety of the figure as to its total inappropriateness that we object. In the whole range of mythology, we doubt whether a less appropriate theme could be found for a statue in a public library than a dancing naked bacchante, and to have such a subject offered for such a site by an architect who finds Minerva's head the most suitable decoration for the keystone of the main entrance arch is a curious lapse that verges on illiteracy. If the figure would have been inappropriate, no less would it have been unsuitable, for what less suited to be the central feature of a water-fountain than the figure — no matter how beautifully poised or how skilfully modelled — of a naked woman, with the face of a hag (as the photographs show it), in hydrophobic saltation?

SOME of the New York papers are discussing the practicability of supplying cold to dwellings and apartment-houses, by means of brine, chilled by the expansion of ammonia, and allowed to circulate through a tank, in the same way that the cold-storage houses of our cities are kept at a low temperature. By enabling housekeepers to dispense with ice, these miniature cold-storage closets would form an excellent and economical substitute for the old-fashioned refrigerators, and the brine-chilled refrigerators are better than those cooled with ice, in being perfectly dry, as the cooling-pipes, which are kept at a temperature of about twenty degrees Fahrenheit, condense upon their surface the moisture in the air around them, and freeze it into a mass of frost-crystals, which often covers the pipes to a depth of an inch or more. In St. Louis, chilled brine for cooling purposes is supplied by a company, from mains

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laid in the streets; but in the cities where cold-storage warehouses are not so common as in St. Louis, individual plants are likely to be required. According to the *Tribune*, a plant suitable for an apartment-house containing twenty-five families costs about five thousand dollars, but it thinks that the extra rents that tenants would pay for sharing in its use would afford a large interest on the investment. It is likely that opinions would vary on this point. The owners of some apartment-houses in New York already supply their tenants with ice gratuitously, as a special attraction; and it is probable that anything so simple as a cooling-pipe service would soon come to be regarded by tenants as a luxury to which they were entitled, without paying any extra rent for it. Under such circumstances, it seems as if small individual cooling-machines would be useful, not only to owners of apartment-houses, but to housekeepers in general. If we are not mistaken, the Raoul Pictet Company, in Paris, makes a domestic ice-machine, which sells for fourteen or fifteen dollars, and will freeze an ice-cream, or a carafe of water, in a few minutes; and it seems as if such a machine might easily be made to chill a tank of brine of sufficient size to keep a refrigerator of moderate size cool, with no further expense or trouble than that involved in turning a crank for a few minutes each day.

IT is interesting to observe the change in the way in which the English trade-unions are managed within the last few years. Instead of being utilized as the cat's-paws of glib-tongued adventurers, with a taste for notoriety, they have recently devoted an appreciable amount of time to the advancement of their own interests, as distinguished from the senseless abuse of other people which formed the sole stock in trade of the labor-reformers of the old type. It will be remembered that, at the last Parliamentary election the most prominent of the demagogues who had hoisted themselves into Parliament by flattering the labor organizations were unceremoniously dropped; and the recent Trades-Union Congress at Edinburgh showed a still more pronounced tendency in the workingmen to act for themselves, instead of putting their affairs in the hands of professional agitators. At the beginning of the Congress, the credentials of the persons who presented themselves for admission were strictly scrutinized, to see whether the bearers were really workingmen, or only oratorical hangers-on of the workingmen's associations. The avowed object of this scrutiny was to exclude socialists and anarchists, and confine the deliberations to people really belonging to the professions represented in the Congress. This, of itself, gave to its deliberations an importance which the proceedings of such assemblages, however violent and revolutionary in expression, have never had before; and it seems really possible that in the future the workingmen's associations may make valuable contributions to social science, and win respect and regard for their thoughtful common-sense, instead of making themselves ridiculous, in their public appearances, by threats of robbery and assassination against Capital, that is, their employers, demands for division of goods, or a "universal strike," and so on. So far as its conduct went, the proceedings of the Edinburgh Congress were unexceptionable. The President, Mr. Mallinson, a shoemaker, delivered an address, which is said to have been strongly anti-socialist, and made the excellent point that the socialists were much more successful in pointing out evils than in suggesting remedies for them. In regard to education, the Congress expressed the wish that improvements should take the direction of "equality of opportunity" for everybody, a sentiment which every American will applaud; and it criticised, not without reason, the failure of the present Ministry to keep its promises in regard to arbitration laws. It is to be noted, however, that with the resumption of the direction of union affairs by men who keep their brains in healthy condition by good, hard work with their hands, the anxiety of organized labor for Government paternalism has suffered a curious diminution. Two or three years ago, under the lead of the demagogue calling himself Keir Hardie, the Congress voted a demand that "all land and money," and "all the instruments of production, of distribution and of exchange," should be "nationalized," or, in other words, seized by the Government. This year, the Congress, without Mr. Hardie's assistance, simply called for the nationalization of mines and railroads, a proposition which has, at least, the merit of being intelligible, while Mr. Hardie's defies all attempts at rational explanation.

A GERMAN society of engineers recently considered the question, why firemen in charge of steam-boilers should be forbidden, as they almost always are in the "practical" text-books, to feed the boiler when any of its plates are red-hot. A commission was appointed by the society to investigate the subject, and report, and its report declared that, instead of avoiding the feeding of a red-hot boiler, the first duty of the fireman or engineer should be, on finding the water-line in the gauges low, and some of the plates or tubes red-hot, to open the feed-water valve immediately, to its fullest extent, so as to let in a large quantity of water, and reduce the temperature of the plates as rapidly as possible. There is absolutely no danger in this, while there is danger in every moment that the plates remain exposed to the heat of the fire without the protection of the water. Another custom of firemen is, when the water gets low, and the plates heat, to rake the fire forward from the middle, with the idea of diminishing its intensity. This treatment undoubtedly, after a time reduces the fire, but its first effect, by stirring the coals, and shaking off the blanket of ashes which forms upon them when they are left for a time undisturbed, is often to increase the heat materially, and with it the strain upon the plates. A far better plan is to open the feeding-doors. This draws the air through the fire-box over the top of the coals, instead of through the grate, and soon checks combustion; while, according to the opinion of the commission, it is extremely advantageous to pour water on the fire, in as large quantities as possible. The principal danger to be apprehended from the over-heating of the boiler-plates above the water-line is the severe strain due to the difference in expansion between the red-hot portions of the plates, above the water-line, and the portions kept at a temperature of about 212°, by having one side covered with boiling water. This strain frequently cracks the plates, or opens the joints. When such an accident happens, the water from the boiler runs down into the fire; and, if a considerable quantity of water should be thus poured out upon a mass of glowing coals, the steam generated would rush from the fire-doors, filling the space in front of the boilers with suffocating clouds. Hence, when the water sinks low in the gauge-tubes, with a hot fire in the furnaces, it is dangerous to remain in front of the boilers, and still more dangerous to attempt any slicing or poking of the fire. Instead of this, the fire-doors should be opened, and the feed-water should be turned on, or the pumps or injectors set in motion; and, if possible, a stream of cold water should be poured on the coals, sufficient in volumes to extinguish the fire quickly, without allowing time for the evolution of a large amount of steam. It will be remembered that the Society of steam-users of Great Britain recently made a series of experiments in suddenly admitting water to red-hot house boilers, and found that there was not the slightest danger in doing so, and the extension of the tests to power steam-boilers is a matter of utmost importance.

LE GÉNIE CIVIL publishes a picture of the steamboat with rotating keels which has just been launched in France. Although only a trial model, the boat is one hundred and twenty-five feet long, and is furnished with engines of five hundred horse-power; so that its preliminary trips, which will probably take place in November, will be watched with great interest. The scheme for its construction originated in the consideration that a large part of the power of a steamship is taken up in overcoming the resistance of the water to the passage of the hull through it. The greater part of this resistance is probably due to friction, and the inventor of the new boat, M. Ernest Bazin, reflecting that, in all mechanical devices, friction is relieved by substituting rolling for rubbing contact, conceived the idea of making his boat consist essentially of hollow wheels, which would float, at the same time that they were rolled over, or through, the water. In the experimental boat, these wheels, which are six in number, are shaped like a double convex lens, and arranged in pairs, and carry, supported on their axles, a platform, on which is mounted the machinery. Besides the five hundred horse-power screw which serves for propulsion, another engine, of fifty horse-power, turns the wheels, at a rate corresponding to the speed imparted to the boat by the screw, so as to reduce the friction in the water to the lowest possible limit. It is hoped that the trial boat will attain a speed of twenty-two knots per hour in the Channel, where the practice trips will take place; and that a steamer of suitable dimensions for ocean travelling may reach thirty-two knots.

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ESTIMATING FROM BILLS OF QUANTITIES.



Chapel for the Adirondacks. Parish & Schroeder, Architects.

IF time is money, as it is sometimes asserted, then the builders, contractors and material-men of this great country of ours, waste millions of dollars annually in *figuring*, or to use the correct phraseology in *estimating*. This assertion is proved by the fact, that the very first persons to suffer for, and to admit this waste of time, are the contractors and material-men themselves. How often do we hear them say, "I am about *tired* of figuring," etc.? Is it to be wondered at when the entire system they practise is antiquated and away behind the times?

In a recent issue of a local building paper, a San Francisco contractor drew attention to the enormous waste of time involved by the present unsatisfactory manner of estimating, and wished for some one to suggest a remedy. A year or two ago, a very able article appeared in the *American Architect*, entitled the "Problem of Waste," and when touching upon "estimating," the author denounced the prevailing method to be reckless, unscientific and unpractical. The San Francisco contractor of to-day, however, is even more explicit, for he does not hesitate to say the present system (if we can call it a system) is rotten, and he is about right, too.

But your readers will say "What is the remedy? What can we do? Contractors must live," forgetting for a moment what a struggle living has been the last year or two, in the building business. The remedy as regards "estimating," which I suggest, is in the hands of the contractors themselves. With their splendid organizations and with a builders'-exchange in nearly every town of any consequence, what is easier, if properly applied? In a few weeks there would be a revolution in the system of estimating throughout this country that would be of incalculable value to the contractors and material-men everywhere.

Figuring would, to competent men, then be a pleasure; risks of loss would be reduced to a minimum, and all without putting them to any expense. The remedy I suggest, believing it to be the only solution of the difficulty, is the unanimous adoption of a National System of Estimating from Bills of Quantities. Not necessarily the same systems as adopted in older countries, but a modification of them, especially adapted to American practice, and with up-to-date ideas. Let us here briefly consider some of the leading points of the subject. In the first place, Whose duty is it to prepare these bills of quantities? These documents are usually prepared by disinterested quantity surveyors, men who have been specially trained in this particular business, for, be it remembered, taking off quantities, as they should be taken off, is a separate and distinct business from estimating the cost, and it calls for very different qualifications and experience than this latter process. In giving a bid upon a building, the only thing which can be reasonably required of a contractor is to say how much money the building will cost. The owner is the person (through the quantity surveyor) to say how much material of all the different kinds is required for the building, and this is only just, but we will consider this farther, later on.

There are three distinct processes or operations involved in the production of a properly constituted bill of quantities, each one of which, I admit, requires more time than is at present allowed, in many cases, to an individual bidder for making up a bid; but then, we get accuracy as compared with — shall I say "guesswork"? for experience teaches me that is all it amounts to very often under existing methods. Quantity surveyors are usually paid by a fee, or percentage, which is included in each bidder's total, and so the owner really pays for the quantities furnished to the contractors. The bill of quantities should form part of, or in reality be the basis of the contract, and the contractor would be bound to do no more work than would be clearly set forth in these quantities; in other words, it would be so much material and labor for so much money, no more, no less. One complete copy of the quantities would be furnished to each bidder who would simply have to price each item in the order set forth.

Let us then consider what a properly constituted bill of quantities should be. In the first place, the document should be printed or lithographed (so as to ensure every copy being alike), containing a complete account and a clear description of every item of labor and material, however small, possessing a money value, as called for by the drawings and specifications. The front or title page should begin with the name, or description, of the building, the owner's and architect's names and addresses, the place, date and hour for receiving and opening bids, date for completion of building and amount of penalty, if any; also the times and conditions of payment to the contractor, particulars as to bondsmen, certified checks, etc., and at the end, the bill should be endorsed by the surveyor who prepared it, and who should be entirely disinterested, as between the parties.

In my own practice I have found it a good plan to begin the list of items with a brief outline of the size and character of the building, then to follow with such items which cannot be measured in the usual sense, but for which some allowance is necessary: for example, plant, foreman, superintendent's temporary office, insurance, lighting, watchman, interest on retention money, pumping, maintenance, testing materials, strike contingencies, water, etc. In some estimates I have had to provide for all these items and it is convenient to have them collected under one heading, a separate sum for the same being carried to the general summary at end of bill.

Then we get to the items proper, beginning with excavator — each class of digging being kept separate: for example, surface digging or scraping, trenches for footings not exceeding five feet deep, trenches over five feet deep, digging to cellars, circular digging, wells, forming slopes, lawns, etc.; in engineering works, where blasting, mud or tide work and such items occur, the same would be segregated according to the difference in value. Under drainage, the quantity of each kind of pipe would appear with numbers of bends, junctions, hoppers, giving depths below surface, street-sewer connections, etc.

The brickwork bill would begin with a short but clear description of the bricks, mortar cement, etc., to be used; then come the number of common bricks in walls of different thicknesses, though (in the absence of any national standard for brickwork) I should prefer to give the number of square yards of each separate thickness, segregating the parts built in cement from those in mortar, etc., the footings and thick walls below ground, chimneys above roof, walls pointed one or both sides, all being kept separate. Brick facings measured by the square foot would be given as "extra" above price of the common brick, and so on. Brick mouldings, sills, etc., by the foot lineal; mitres, return ends, etc., for these should be given, since in good work these should be specially moulded, and not cut from ordinary stock. The same would apply to brick copings, bands, belts, imposts, cornices, etc. Fair arches are usually measured by the square foot, rough arches numbered, a detailed description of opening, rise, thickness, height, etc., being given. Numbers with detailed descriptions of such things as cutting holes, setting grates, ventilators, boilers, etc., would be given, together with the building of chimney-tops to detail, panels, etc., marginal sketches being given where necessary to clearly illustrate the detail.

Again, in the mason's bill would appear feet cube of rough stone in blocks from quarry. Tons or yards cube of rubble-stone, etc., beginning with the heaviest or largest items. Following this, come all the lineal stone items, *i. e.*, stock under 12 x 12. Small stones are usually just numbered and properly described. The labor on stone should, if the work be large, be taken off separately and described by the square foot, such as half-sawing, plain work, sunk work, plain work circular, sunk work circular, sunk work as in niches, grooves; then would follow moulded work, as in cornices or belts; moulded circular, rubbed and polished work, as on granite; straight and circular, and sometimes *circular circular*, as in spheres, etc., each and every piece of work having a different money value, and, therefore, to be accurate, each should be segregated and priced accordingly. In general terms the same principle would apply to millwork and all the different trades following.

The foregoing are merely brief illustrations of the scope and character of a proper bill of quantities, such as would be prepared by a qualified surveyor, and must not be taken as representing all the items in these trades. In some cases there might occur hundreds of items, indeed I remember some years ago preparing quantities for a job and the bill contained over three hundred fool's-cap pages of items; but I have no knowledge that the successful contractor found a single item *too many*, and I have reason to think there was not one too few. But to return, each trade in the quantities having been figured by the contractor and totalled, the amounts would be carried to the general summary blank always found at the end of a bill, this summary in its turn should then be totalled, and the sum thus obtained is the net estimate for the building. Only two points now require attention: the one is to add the percentage of profit required; and the other is to include the surveyor's fee, the result being the amount of the bid ready for the proposal form, if one is to be used.

Unsuccessful bidders retain the bills of quantities they have priced, and as everything is in minute detail, these documents become very useful to contractors for reference when making up future bids; indeed, by comparing their bids for a time with the figures of the lowest bidders, some very useful and reliable hints as regards percentages, etc., can be accumulated. Of course, to prepare such quantities as I have outlined requires considerably more time than one bidder usually gets for making up a bid, but twenty years' experience as a quantity surveyor teaches me that the only *safe*

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method of estimating is to go carefully, through every item in the drawings and specifications, and to systematically measure and describe, piece by piece, every single part in detail, trade after trade, omitting nothing, guessing at nothing, considering all things and taking no risks; and when this has been conscientiously accomplished and put into a uniform and intelligent shape, we have then a complete and properly constituted Bill of Quantities. Moreover, there is no reliable "royal road, or short cut" method to estimating. Cubing and measuring by the square are but approximate guesses, at the best, and while being "near enough" for certain rough purposes, they are unworthy of the notice of the accurate estimator, when the object is to determine the amount of a contract.

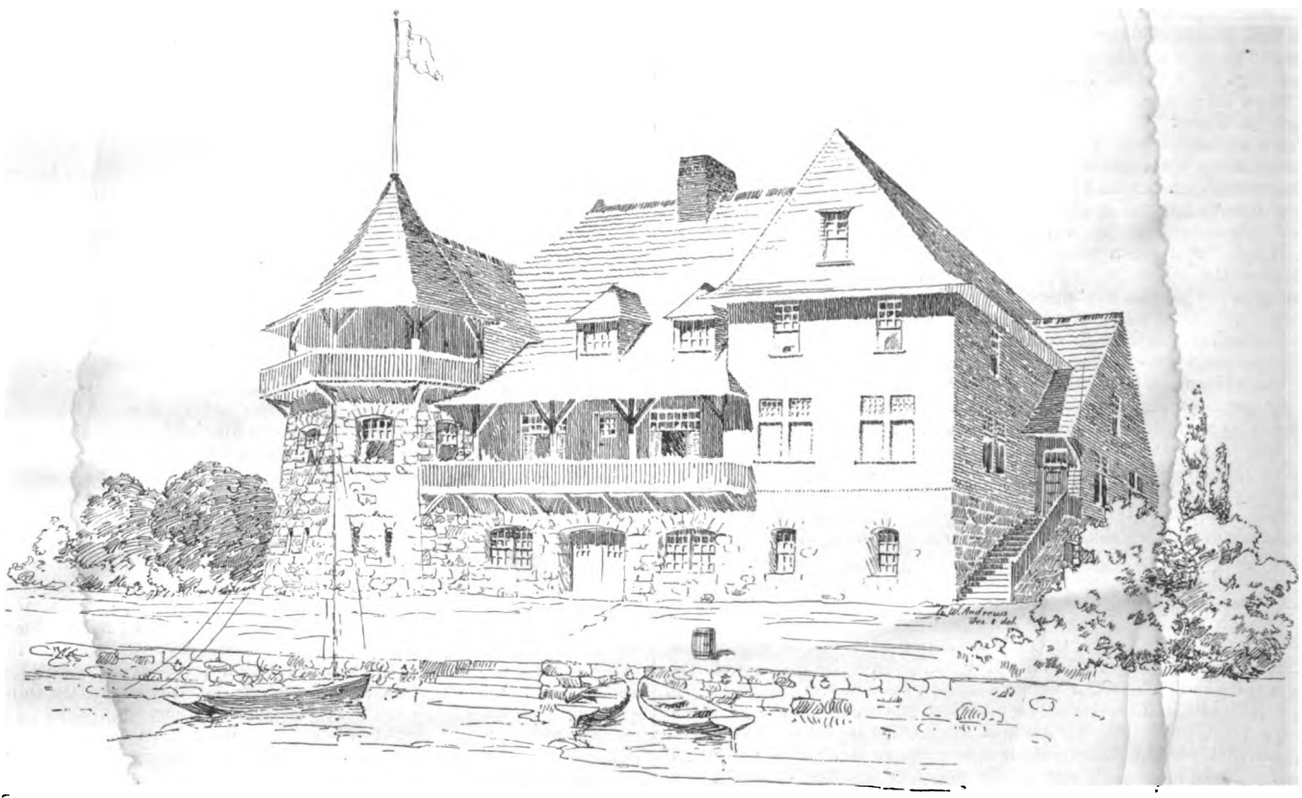
Before proceeding farther, it may be interesting to see what systems of estimating are found to be successful in other large communities. In 1891 it was my privilege to visit the City of Melbourne, which is considered to possess the distinction of being the most American type of city in the world outside the United States. There, the same quantity system of estimating which I advocate as a remedy for the present unsatisfactory conditions in our country had been in operation for about twelve years. The Builders' Association of Sydney, N. S. W., whose institute I also visited, had just passed resolutions adopting the quantity system. Modifications of the same system, but covering the principle of measure and value, have been in use in France for years. In Scotland and Ireland quantities are largely used. In England the quantity system has been adopted for many years. In Germany and other parts the principle of quantities, or measure and value, prevails, and so it will be seen that the quantity system has been extensively tested for many years, and I know of no community where this system, once adopted, has been abandoned for the old method, such as we still use in the United States.

It is a mystery that some more able pen than mine has not, ere this, aroused an interest among building and architectural circles in this country upon this vitally important subject, if only sufficient to cause the appointment of a committee of leading architects and contractors to look into the subject, and to circulate information thereon, and this is necessary before anything satisfactory can be accomplished. Many contractors know nothing at all of the quantity system and its workings. Others have but a vague idea of the subject, imagining that some other man is to make up their figures for them, but the quantity system is nothing of the kind. These men would have plenty of opportunities left to exercise their skill and judgment in putting paying and yet winning prices to the quantities of work as furnished to them by the quantity surveyor, and many a contractor and material-man in this country would welcome the opportunity of being able to give more of his time to buildings in progress, and of exercising a closer supervision of the work that he really has, in place of wasting half his time, as many do now, in figuring, and figuring, and figuring, month after month, and year after year, and what does it amount to after all? These men *know*. Let the owner say how much labor and material he wants, then the contractor can tell him how much it will cost in very short order, and we shall hear no more about contractors and material-men wasting their time.

Some five years ago I was invited to address a meeting of the San Francisco Chapter of Architects upon this subject, and it was then pointed out that the contractors and material-men must take the initiative, and so it remains to-day.

But let us consider what *are* the advantages of the quantity system other than preventing this enormous waste of time, for we must recollect that many of the bidders in figuring a job are all going over precisely the same ground, each doing the same thing in fact, and which could be done by *one* and the same man, just as efficiently. In the first place, a contractor can make up a bid for a large building in an hour or two, and without going through the drawings and a voluminous specification. There is no risk of omitting any portion or parts of the work. How often does it happen that a man gets a contract simply through forgetting to include something. Many a reader will be able to recall some such circumstance in his own experience, which would never have happened if he had figured from a bill of quantities. Many a man has lost a profit, or more, upon a job, and many an owner has benefited thereby, through some such mistake in the items.

Quantities protect the competent bidder against the incompetent one, for the reason that they both start even, from the same well-defined basis as regards *quantity*; the competent man is not then handicapped, as is often the case now, by the incompetent man for-



Design for a Yacht-club Club-house, by Geo. W. Andrews, Cleveland, O.

getting his sheathing, flooring, or plumbing, etc., and thereby getting the contract. This is no imaginary case, it occurs daily under the present method, and everybody suffers in consequence, except perhaps the owner, and it is doubtful whether he doesn't suffer in the long run. But the mischief does not end here — competent men who do get in all their items endeavor to check this growing difficulty by cutting their itemized prices down to cost, or nearly so, and the result is, that to-day the average competition job is scarcely worth having, so far as "profit" is concerned. Dull times alone are not responsible for low prices: the present wretched method of figuring is equally to blame.

Again, if there are any changes on a contract, the builder's claim for payment is beyond dispute. A reference to the quantities discloses the price of the items; this, and a measurement of the quantity of extra work done, settles the matter once and for ever. Separate lists could be furnished to millmen, masons, plasterers and others, showing clearly in black-and-white exactly what these tradesmen were expected to furnish, and there would be an end to disputes as to whether this item, or that item, was figured upon or not, exclusive of the saving of time it would be to these men. Another point is that competitors would be relieved from troubling the architects with inquiries as to the meaning of this or that. All such questions would have been previously settled by the architect through the quantity surveyor.

There is no impediment, nor any real reason, why a National System of Estimating should not be inaugurated if the subject be properly ventilated and understood, and if once the quantity system

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be introduced, the beneficial results will be immediately apparent and the only regret will then be that something of the kind was not done before.

A contractor suggested to me the other day that a quantity surveyor *might* favor a certain contractor. I do not hold this view personally; still the point may occur to some of your readers, and it would be unfair not to give it a moment's thought. Quantity surveyors are qualified men in regular practice, whose entire professional capital is *honesty* and *ability*, disinterested in every way, acting fairly and in good faith between owner and contractor, without fear or favor, and desirous only of doing what is just. They should not be in the regular employ of any person, their services being engaged by the architect (as the owner's agent) only as required, and for the special service indicated; and no surveyor in his senses would jeopardize his practice and place himself at the mercy of an unscrupulous contractor — for it would be only such who would try to benefit by those tricks. Moreover, detection would be the easiest thing possible. If quantities were taken manifestly "too full," the vocation of such a surveyor would soon be gone and contractors could decline to estimate upon his quantities. Any difference in quantities could easily be detected by a comparison of the different sets issued to bidders, whilst a spare set might be deposited with, say, the Estimating Committee of every Builders' Exchange, for public inspection of its members.

Again, there is no business probably in which such an amount of labor and judgment is necessary in making up accurate estimates as in the "building trade," no business in which the opportunities for mistakes are so numerous. Owners do not understand this, probably, when wanting bids upon buildings which may, or may not, be carried out — depending upon their fancy or depth of pocket. This is all wrong, and if contractors are willing to give their brains and time in making the money estimate, the owner should, in common fairness, accept his share of the responsibility, and say definitely and exactly, just *how much material* and workmanship he requires estimates upon.

In conclusion it is almost impossible to do justice in an article of this nature to this important matter. I shall be pleased to receive any suggestions or observations that may in any way assist in promoting the adoption of an improved National System of making up bids for modern building and engineering works.

G. ALEXANDER WRIGHT.

THE ARTISTIC ELEMENT IN ENGINEERING.[1]

A FRIEND of the writer, a successful business man and much interested in things artistic, when informed of the choice of subject for this paper, gave expression to a feeling of surprise, doubting if there were any relation between engineering and æsthetics.

One of the leading engineers of America once asked a professional brother what he did for recreation, and on being told of a modest interest in pictures and music, likewise expressed surprise, saying, "You are the first engineer that I have ever known to be a musician." There was also an implication, though unintentional, of a diminished respect — perhaps on both sides.

These two incidents may be taken to typify in a general way the attitude that is held by the business world, on the one side, and the engineering fraternity on the other, toward the relationship which it is proposed here to discuss. . . .

The engineer is primarily a designer. He works with the materials of nature as his medium and her powers as his tools, wherewith to express his thought and his purpose to serve and benefit man. Just as in the making of a picture, the brushes, paint and canvas are not the chief things, so here it is not the stone, steel and brass or the powers of gravity, steam, air and electricity that are most important, but rather the character and quality of the design and the degree of realization in its execution. The design may be bad or good, according as it ignores or harmonizes with principles underlying all such of acts of creation. The result may be a happy one only when the means employed are rightly chosen and properly adapted to the end sought. In this process of creating something of value, something that helps a man to a fuller, richer and better life, the artistic cannot be left out. In its absence the design falls far short of its possible perfection, and man is deprived of what is due him, though not perhaps distinctly conscious of the loss. In a certain sense, then, every engineer is an artist, and in some directions at least, as in architecture and other forms of construction and in the making of public parks, the result of his cultured brain may attain to the dignity of a work of "fine art." Perhaps, in its true essence, there may be as much fine art in the design of a machine to produce bolts as there is in the making of a picture for the *Salon;* certainly the well-planned tool with fine proportions and parts perfectly related is above the poor canvas. . . .

To the superficial or hasty thinker there may appear a conflict between the utilitarian and the artistic, but there can be no real antagonism. The result of an act of designing is to be judged as a whole in the light of all the purposes to be fulfilled. The physical conditions imposed by the materials used and the forces of nature employed are to be met. These conditions must be expressed in the design frankly and candidly, and in such a way as to indicate clearly its purpose and to gratify the observer through its proportions, symmetry, harmony and decoration. The end desired must be attained in the most direct and simple way, so that the expenditure of money may be a minimum. These are the three elements of design, scientific, æsthetic and the financial. A disregard of the requirements of the first may mean structural or organic weakness, on the one hand; or on the other, an excess of material that unduly adds to the cost and at the same time may produce heaviness or ugly proportions in the completed work. Non-compliance with the demands of the second makes the design fail in fulfilling its complete mission; this applies with the same force to those cases where a poorly directed attempt has been made to be artistic in expression, as to those in which no attention whatever has been paid to the matter. Artistic treatment often costs money, yet the mere expenditure of cash will not secure it. On the other hand, the proper display of good taste may often come without the spending of a dollar more than is made necessary by the other conditions surrounding the problem. A wealth of ornamentation may be brazen and vulgar, while beauty and grace may be found in the simple lines of a machine or bridge, or in the curving of the curb by the roadside. The disregard of the financial side may mean either a weak, meager and unsatisfactory result, or an unwise lavishness in expenditure, in both cases producing in the long run a loss and waste of money. . . .

We are not an æsthetic nation, but we have latent possibilities in that direction; we are young, confident and impressionable and have the courage to be original in design, which counts for much. We have evolved the American locomotive, the American truss bridge, the American automatic machine, the American much debated tall building, and many other things especially adapted to American needs. We shall grasp the artistic possibilities of construction quickly when we come to know what they are, and will apply them confidently, not always at first with the most happy results. We shall learn something from the Old World and will assimilate much that is good in its practice, but in the end engineering here will be both artistic and American. . . .

"The American designer is not an artist like the Frenchman, but is more attentive to appearance than the Briton. He is gradually curing himself of the tendency to tawdry ornament, needless accessories of fancy castings, stenciled paints, japanning out of place and bright work for mere effect." These are good qualities and in the line of improvement. Some recent installations of power plants illustrate a movement that will have considerable influence on engine design. In many of our larger cities there are engine-rooms fitted up in elegance, with marble floors and wainscot, decorated walls and ceilings, brilliantly lighted and with all the appliances of the plant, engines, dynamos, switch-boards and even the smaller accessories in keeping with the surroundings. These plants are used as drawing cards or advertisements. There are other plants not so used, where there is displayed less elegance, but fully as much artistic sense in adapting the room and its treatment to its purpose. In many of these places only the inclosed type of engines can be used. In all of them the standard of maintenance must have its influence on the matter of design, which will, in turn, react on the former. An engine might pound itself to death in a dark basement, but would have its slightest vagary looked after in one of these better planned housings. This result cannot be entirely accounted for by the larger room, the better light, the rules and regulations. There is a refining, educating influence in these artistically planned constructions that makes better men and more efficient workmen of the attendants. Whatever they may cost, there is a credit side to the balance sheet.

Our railways are contributing toward this change. They have found the decoration of passenger-trains a profitable thing, and so stimulated, have carried it to excess. Handsome terminal stations adorned in good taste, are supplanting the dingy, forbidding and inconvenient places so long in use, while the shed type of depot is being crowded out by beautiful, quaint buildings set in the midst of lawns and flower-beds. More significant still is the tendency to adopt a high standard of maintenance, under which the road-bed is kept trim and neat, flanked by sodded slopes and bordered by clean and well-kept buildings, which also requires the rolling stock, the shops and yards to be maintained in a high state of efficiency. This is not necessarily in itself artistic, but it furnishes at least a necessary foundation. That the railway management understands, to some degree, the commercial value of the artistic element in its business is further evidenced by the nature of its advertising, that seizes on any advantage of scenery or artificial effect that is at hand.

Not much can be said in praise of the artistic qualities of our bridges, for these attributes are conspicuous through their absence. The American bridge satisfies the conditions of stability and least cost, but of beauty of line or balanced proportion that make it fit into and harmonize with the landscape or even that makes it attractive, considered by itself, it has little. And this is to be the more regretted because an intelligent application of right principles would much improve the effect, without adding much, if any, to the cost or making the structure less safe and durable. . . .

In the entire field of engineering there is no portion of it that includes a greater variety of intricate and difficult problems for solution than that connected with municipal life. Here the engineer has to do with matters touching the home life, the dwelling, its heating, ventilation and lighting, its drainage and water-supply, etc.

[1] Extracts from the Address of the Vice-President before Section D, Mechanical Science and Engineering, at the Buffalo meeting of the American Association for the Advancement of Science.

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There is the business life that demands attention for the stores, office-blocks, banks and exchanges, manufactories and shops, warehouses and elevators with all of their requirements of heating, cooling, lighting, ventilation, drainage, power and internal communication through elevators, pneumatic systems and alarms. Then there is the larger life of the city as a whole that needs public buildings, churches, schools, hospitals, libraries, museums, hotels, theatres, railway-stations and markets, each with its own peculiar demands; streets and systems for rapid transit, both intramural and suburban; the distribution of water, heat, cold, light and power; pneumatic systems for carrying packages; electrical conduits; sewerage and garbage systems, with the plants for their treatment or disposal; wharves and railway yards; parks, boulevards, playgrounds, plazas; the opening of new territory to accommodate the city's growth.

The engineer here comes in close contact with the people that daily and hourly use the results of his works. He already influences their health and bank accounts for the better, gives them greater ease and convenience at work or play and saves their time. This is what is asked of him and he meets the demand well. But what an uplift would come to city life, how much richer it would be, if he could put an artistic quality into his designing, and the people would learn to appreciate it. It is not to be inferred that there is an entire absence of this, but rather that artistic effects have been largely confined to individual cases, and not made manifest in the general life of the city. For instance, there are numerous examples of suburban dwellings, beautiful internally and externally and with harmonious settings; there are occasional business-blocks whose treatment is satisfactory, but very few public buildings that have an adequate artistic meaning and are so situated as to express this advantageously if they did possess it. Without detracting in the least from the acknowledged merits of Trinity Church, Boston, it must be admitted that its roomy location on one side of an open plaza adds greatly to its effectiveness. Think of its being placed in the middle of a block on Washington Street, or set in the midst of brownstone fronts on Fifth Avenue.

All public buildings need both room and an appropriate setting. They are the larger and more important pictures in the gallery of city structures; yet under the prevailing system of rectangular blocks, bounded by long, straight and narrow streets, the hanging committee has nothing but the walls of corridors on which to place them. The worst of the matter is that the exhibition is a permanent one. Along these alleyways must also be hung the narrow, vertically elongated panels that seem to be so popular to-day, in favor because they pay. The observer needs a twenty-story ladder in order to study their details or even to know if they have any, and can find no point from which they can be seen as entireties. At their sides hang strings of pictures whose horizontality exaggerates their skyward tendency. It is not the modern tall building in itself that is here objected to, but its location on sites that will not admit of a display of its best qualities. With wide, clear surroundings and effective grouping they may be made agreeable, as is illustrated by the happy combination at the southeast corner of Central Park.

One of the good results of the tall building craze is the bringing closer together of two branches of designers; from the architect the engineer will learn more of art and he will teach the former better construction. While retaining their separate functions, the collaboration will result in a higher mutual respect and appreciation and a better grade of work on the part of each.

It is undisputed that the rectangular plans of American cities are neither adapted to meet æsthetic conditions nor the demands of traffic. The long streets, without variation in width and direction and without the breaks afforded by little parks, are tiresome to the eye. They are not placed with any regard to the topography or the natural features of the landscape, or to give prominence to some important structure, nor do they furnish direct lines of travel. But the plan is weighted down to the ground by millions of money. So it is not a question of what it ought to be, but one of mitigating the present evils and avoiding a repetition of these in the future. Radical treatment must be resorted to by way of diagonal avenues from congested centers and the widening out of the intersections of important streets into parks and plazas. There must likewise be an heroic struggle with the water-fronts and internal water-courses, places full of picturesque possibilities, though usually given over to filth and ugliness. These changes are made imperative not only by æsthetic requirements, but also by the demands of health and business. . . .

In the design and maintenance of water-supply plants, American practice shows some respect for the artistic element. This is not confined to any particular system or any part of any one plant, but is quite general. The engine-houses are not ugly and their interiors are often attractive. Gate-houses, aqueducts and dams are decoratively treated and form pleasing features in the landscape. The slopes of reservoirs are kept trimmed and the grounds generally turned into lawns with flower-beds and perhaps a fountain. No doubt, the sanitary conditions imposed have much to do with this, but the result is none the less in good taste. We cannot avoid, however, a stray shot at the ugly standpipe with conical cap, sometimes seen in our smaller towns. This is unnecessary. When inclosed it has been made an interesting object, and even the bare pipe can be ornamented in such a way as to relieve its nakedness.

There is much encouragement in the growing appreciation and enjoyment of public parks and boulevards. Cities and towns all over the land are trying to beautify what they already have and are adding new territory to their park resources. Admirable skill has been shown in utilizing the natural features of the local landscape, the rocks, tree masses, meadows, ravines, ponds and streams, the wide expanse of ocean or glimpses of bright water. The curving roads and paths, with undulating gradients, have a beauty of their own and lead one from point to point of the ever-changing scene, and yet bind it all into one harmonious whole. While the landscape engineer deserves credit, not so much praise can be given park commissioners for the artificial adornments which they have added to his work. Notwithstanding the fact that these are sometimes labelled as artistic, they do not always fit in appropriately.

The writer firmly believes that there is a latent æsthetic quality in American life that is now struggling to find both means for its gratification and methods of expression. Before there can be knowledge of its meaning and power there must be many attempts and many failures. The whole process is one of education and that largely in the school of experience. This applies to the industrial and constructive arts as well as to the fine arts. The engineer will share in the general movement, but this is not enough. As a designer of so much that the world needs for daily use he must do more than keep up; he must keep in advance. He must not only have a capacity to enjoy, but also the power to originate and apply. To this end he must give preliminary study and thought to the principles of æsthetic design, so gaining an intellectual knowledge of them. American engineering schools are doing little or nothing to help the young engineer to this. So far as the writer knows, there is but one American text-book, Prof. Johnson's book on bridges, that includes any discussion of the matter. A course of study in engineering æsthetics near the close of college life would be a great help and stimulus to a young graduate, at least opening his eyes to the fact that there was such a thing. After knowledge comes the application of principles as tests to an engineer's own work and to that of other men. And, finally, with theoretical and practical knowledge well in hand and a love of what is beautiful, comes the impulse to work artistically. With such engineers and an appreciative *clientèle* American engineering would be artistic. To this end let us work. —*Frank O. Marvin, University of Kansas.*

BOOKS AND PAPERS

JUST as the art of "sign-writing" is held to be one of the upper branches of the house-painter's work, so acquired skill in the art of lettering drawings is held to be evidence of a thoroughly trained and expert engineering draughtsman. Even on architectural drawings, no greater wrong can be done the author's work than to describe it on its face with a slovenly and really illiterate attempt at lettering.

Engineers are generally great sticklers in the matter of lettering their drawings and make greater demands on the skill and accuracy of their draughtsmen in this portion of their work, than architects are wont to exact when it comes to lettering architectural drawings. This is quite proper and reasonable and the reason is not far to seek. Engineering drawings have to be made with greater accuracy and the expenditure of a more minute skill, for the reason that, so far as topographical work goes, these drawings are made at scales varying from ten to hundreds of feet per inch and the several features of the drawing, as well as the multitudinous figures, must be legibly figured and lettered, each in its proper place and at its proper relative scale of importance. Architects, on the other hand, rarely have to work at less than a sixteenth scale, and on such drawings there is ample space enough for lettering, and so architectural draughtsmen are not compelled in their daily work to acquire the same nice sense of balance, proportion and accuracy of handling that their engineering fellows, at length, use automatically.

It follows from this that most publications that deal with the art of lettering have been prepared for and by engineers, not architects, and we have allowed several publications of the kind to accumulate on our table, awaiting a convenient time for their examination. The first of these is a little paper-covered pamphlet[1] which has the signal merit of being printed on cross-section paper, so that the student can easily construct his letters in due proportion. The few samples shown are mainly of the block-letter type, with variants upon it.

The next one, a somewhat larger and more ambitious work, seems to have been called into being because one of the instructors in a Western college did not find at hand the kind of book which he wished his pupils to have by them in their drawing-room. It is possible that it may have served its intended purpose, but as it exhibits, and therefore inculcates, little of that precision and nicety of handling that engineers like to have their draughtsmen employ, even when their own early training has not been such that they could acquire it themselves, it seems to us unlikely that they would care to advise the pupils in their office to procure and study this work.[2]

[1] "*A System of Easy Lettering.*" By J. Howard Cornwell, Ph. B. New York: Spon & Chamberlain. 1893. Price, 50 cents.

[2] "*Lettering of Working Drawings.*" By J. C. L. Fish, C. E., Asst. Professor of Civil Engineering in the Leland Stanford, Jr. University. New York: D. Van Nostrand Company. 1894.

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The same publishers, later, issued another book [1] of about the same size which is in some ways an improvement on the publication just mentioned. It contains a greater variety of alphabets and the few pages of text give fuller and more varied advice and suggestion. Moreover, it has the practical advantage over the books before mentioned that it includes several illustrations of engineering drawings and one or two topographical maps, so that it fairly contains not only precept but example.

But the only book that seems to us to have been really "worth while" is the work [2] of an instructor in an Eastern college and has about four times the amount of matter that either of the others contains. Its four dozen plates give a great variety of alphabets, numerals, scales, etc., all executed with great accuracy, and named and proportioned with an agreeable sense of propriety. A few samples of map work and engineering detail-drawings fairly parallel those good features in Mr. Reinhardt's smaller book. The plates alone would make the publication valuable, but the great merit of it lies in its eighty-odd pages of text, which give in excellent form not only instruction about the formation of the letters themselves, but advice and suggestion about several related matters, such as spacing and word-spacing, the proportioning and distribution of the title words, the lettering of patent drawings, stencils, mechanical devices used for lettering, lettering for reproductive processes, blue-printing, etc. It is an excellent work and one which the architectural draughtsman could use to great advantage, for he could in the matter of lettering approach more nearly the standard of his engineering brothers without having the product of his hand do him any too great credit.

SOCIETIES

THE SECOND "AMERICAN ARCHITECT" COMPETITION.

WE desire to call to the attention of the several associations of architectural draughtsmen that we are unable to award and distribute the prizes for the Second *American Architect* Competition, ["A Baptistery Screen," published in our issue for May 16th], owing to the fact that before disbanding for the summer vacation only two sketch-clubs had communicated to us the result of their balloting.

Now that the autumn and winter work has begun, we trust that the officials of the several clubs which have not yet declared their preferences will be able to send us the desired information, without further delay. — EDS.

SKETCH-CLUB OF NEW YORK.

THE regular monthly meeting and dinner of the Sketch-Club of New York was held Saturday evening, October 3d; the President, Mr. J. Oliver Cummings, occupying the chair. Forty-five members were present.

Mr. G. A. Audsley read a paper on Hellenic Renaissance — Greek architecture adapted to modern requirements. This paper was one of the best ever presented to the Club and was thoroughly appreciated by the members present. Mr. Audsley has kindly consented to favor the Club with another paper illustrated by lantern slides, to be given in the near future at a special meeting arranged for it.

The proposition made to change the date of the annual election of officers was laid over until the next regular meeting, on account of the absence of Mr. Field, who made the proposition.

Mr. Sconce, Chairman of the Architectural Research Class, made a report on the work done by the class in his charge. About fifteen members have entered it and many more have promised to come in. They are all earnest workers, and the drawings displayed around the room were ample evidence that the class was a success. Every fellow who desires to enter into this interesting way of studying the history of architecture should report to Mr. Sconce at once. Life classes have been organized under the leadership of Mr. John Nolan; Pen-and-ink classes under Mr. J. J. Maginnis; and Water-color classes which are now being arranged by the Executive Committee, will be announced very soon.

Sketches have been made for the proposed decoration of the Club's rooms, and estimates are being made by decorators.

Besides the drawings exhibited by the Research Class, several water-colors and pencil-drawings representing summer work were shown. Those made by Mr. Kendrick were especially good. Messrs. Darsh and Van Suetendael have also done some good work.

Meeting adjourned 10.45 P. M.

HARRY P. KNOWLES, *Recording Secretary.*

SOCIETY OF BEAUX-ARTS ARCHITECTS.

THE Committee on Education of the Society of Beaux-Arts Architects has decided to hold three competitions for advance students (Class A), and three competitions for beginners (Class B) during the coming season.

Programmes will be issued: October 15, 1896; January 15, 1897; April 15, 1897.

Drawings will be rendered: January 15, 1897; April 15, 1897; June 30, 1897.

Competition Class A will be open to all students having obtained a Medal, one First or two Second Mentions, in any of the competitions held heretofore, and to all students in any of the colleges.

The Committee on Education will make exceptions in favor of students wishing to enter a competition in this class, upon application from the students, endorsed by their Professors, to the effect that the student is capable of doing the work in this class advantageously.

Competition Class B will be open to all students of architecture who may apply for admission, provided that their application is endorsed by their Professor.

Students of all colleges of architecture are especially invited to enter these competitions.

The competitions will be held under the direction of the Committee on Education, who will issue the programmes. The drawings submitted by the competitors will be exhibited publicly in this city at least two days before the judgment and at least one day after the judgment. The judgment will be rendered by a Committee of not less than eight, nor more than ten, which will consist of the five members of the Committee on Education, and five other members specially invited to serve as a Jury of Award. The Jury will classify the drawings in the order of merit, and will award First, Second and Third Mentions, respectively, to such drawings as may seem to them to deserve recognition. The Jury will award for each competition under Class A, one medal to the most meritorious drawing; it being, however, left to their discretion not to award a medal should none of the drawings prove deserving of such recognition.

Each student receiving a Mention will be entitled to receive from the Society a certificate of award. The programmes for the different competitions, and any other information relating to the competitions, can be obtained from Mr. Albert L. Brockway, Chairman of the Committee on Education, 55 Broadway, New York, N. Y.

As the students participating in these competitions are located all over the United States, it has been found very difficult to send them notices relating to the competitions, and hereafter, all notices, especially those relating to dates of Exhibitions, awards of the Jury, publication of the programmes and other important matters will be published in the *American Architect*, and the students are especially requested to give these notices their attention.

[The programmes for the First Competition may be found in our advertising columns. — EDS.]

(Signed) ALBERT L. BROCKWAY, *Chairman*,
JOHN M. CARRÈRE,
JOHN G. HOWARD,
WHITNEY WARREN,
E. L. MASQUERAY,
} *Committee on Education.*

NEW YORK, N. Y., October 15, 1896.

The exhibition of the drawings rendered in the last competition for "A Ferry House in the City of New York," and "A Public Mortuary Chapel in a Large Cemetery," will be held at the Fine Arts Building, 215 West 57th Street, New York City, from 9 A. M. to 10 P. M., on the 26th, 27th and 28th of October, excepting the evening of October 27th, when the exhibition will be closed for the judgment of the drawings. All students, members of the Society, and others interested are especially requested to visit the Exhibition and examine the drawings. Admission free.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

CLUB-HOUSE OF THE CALUMET CLUB, MICHIGAN AVE., CHICAGO, ILL. MR. CHARLES S. FROST, ARCHITECT, CHICAGO, ILL.

[Gelatine Print, issued with the International and Imperial Editions only.]

NEWTON NATIONAL AND SAVINGS BANK BUILDING, NEWTON, MASS. MR. W. G. PRESTON, ARCHITECT, BOSTON, MASS.

THE building is situated in a square formed by the junction of Washington, Centre and Hall Streets, the general outline of the building being triangular in form. The angles all being unlike, it has seemed advisable to introduce a circular bay at each of these points, harmonizing and simplifying the relations of the three sides with each other.

The building is to be semi-fireproof in character, and will be occupied by two banks, having their individual vaults in connection and away from all outside walls and dangerous exposures. The second story will be used for offices under control of the bank. The building is to have the basement of granite, and above that, white brick

[1] "*Lettering for Draughtsmen, Engineers and Students.*" A Practical System of Freehand Lettering for Working Drawings. By Charles W. Reinhardt, Chief Draughtsman *Engineering News*. New York: D. Van Nostrand Company. 1895.

[2] "*A Text-book on Plain Lettering.*" By Henry S. Jacoby, Assoc. Professor of Civil Engineering in Cornell University. New York: The *Engineering News* Publishing Company. 1895.

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and terra cotta similar in color. The roof will be of red, glazed Spanish tile. The banks will be finished in mahogany, and the whole building heated by steam and lighted by electricity.

DIAMOND ICE COMPANY'S PLANT, STAMFORD, CONN. MR. H. J. CARLSON, ARCHITECT, BOSTON, MASS.

The owners desired to make use of an old stone tower that stood on the site, and also that the design should provide for a roof-garden.

ACCEPTED DESIGN FOR THE VICTORIA COUNTY COURT-HOUSE, VICTORIA, TEX. MR. J. RIELY GORDON, SAN ANTONIO, TEX.

LEICESTER PUBLIC LIBRARY, LEICESTER, MASS. MESSRS. EARLE & FISHER, ARCHITECTS, WORCESTER, MASS.

HIGH-SCHOOL BUILDING, GRANITE CITY, ILL. MR. F. C. BONSACK, ARCHITECT, ST. LOUIS, MO.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXI: THE PARK, ST. CLOUD, FRANCE.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXII: LA GRANDE ALLÉE, GARDEN OF THE TUILERIES, PARIS, FRANCE.

GILDED LEAD DECORATION ON THE QUEEN'S STAIRCASE, PALACE OF VERSAILLES.

[Additional Illustrations in the International Edition.]

READING-ROOM: CALUMET CLUB-HOUSE, CHICAGO, ILL. MR. CHARLES S. FROST, ARCHITECT, CHICAGO, ILL.

[Gelatine Print.]

CARD-ROOM IN THE SAME CLUB-HOUSE.

[Gelatine Print.]

BRITISH INDIA CONFERENCE ROOM: IMPERIAL INSTITUTE, LONDON, ENG. MR. T. E. COLLCUTT, ARCHITECT.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

TO LAY A BASEMENT FLOOR OVER CONCRETE.

Boston, Mass., October 13, 1896.

To the Editors of the American Architect: —

Dear Sirs, — Will you kindly give me some information as to the following:

For economy of space it is proposed to use concrete with sleepers to support a basement floor, instead of girders and timbers. Which will rot the soonest, the sleepers imbedded in concrete flush at the top, therefore leaving no air-space; or to have them resting on or imbedded about three-fourths of an inch in the concrete, thus having a space between floor and concrete for ventilation of air; conditions being equal, to rest on sandy soil?

Would there be any more spring to a floor supported by 3 x 4s, resting on or slightly imbedded in concrete, than one supported by 2 x 12s on girders, using them the same distance on centres?

Respectfully yours, Thomas F. Power.

[Sleepers imbedded to the top either in concrete or sandy soil, and covered with a floor, will soon rot. If imbedded only three-fourths of an inch, they will last longer, and, if only laid on the concrete, longer still, but in this case it is not easy to get them firmly bedded on the more or less uneven surface of the concrete. The best plan that we know of in such cases is to lay first on the concrete spruce strips, one inch thick, and four or five inches wide, which have been well dried, and thoroughly coated all over with tar. The sleepers are then laid across these strips, at right angles with them, and the boarding nailed to the sleepers, and holes bored, a few inches apart, through the flooring, around the sides of the room. In this way a circulation of air is maintained in all directions under the floor. If the tarred strips are not more than two feet apart, the sleepers may be two inches thick. As to the spring of the floor, everything would depend on the span of the beams or sleepers. It is an easy matter to calculate the deflection for any given case. — Eds. American Architect.]

NOTES & CLIPPINGS

Air-Cushion in an Underground Railway-Tunnel. — A curious defect has been discovered in Buda-Pesth's underground railway. There are not enough ventilating apertures in the tunnel, and the trains rushing through it compress the air in it like that in the tube of a Zalinski pneumatic gun. On some occasions the cars have been lifted from the track, and the passengers have been almost suffocated. One stretch of tunnel two miles long has only a single ventilating aperture, making it almost an air-tight compartment. Any constructing engineer ought to have known what would be the result of such pneumatic conditions. — *Boston Herald.*

The Clock of St. Michael's, Hamburg. — The largest clock in Germany is now being placed upon the tower of St. Michael's Church in Hamburg. This church spire is the first landmark of Hamburg visible to the shippers on the lower Elbe, as it is situated at the highest point of the old Hanseatic town. The four dials of the clock will each measure twenty-six feet in diameter. The minute-hand will measure twelve feet from the centre of the dial, while the hour-hand will be almost ten feet long. The clock is constructed in such a way that even heavy birds perching upon the hands will not appreciably interfere with the time-keeping of the clock. The chimes will be heard for one-and-one-half miles around and will be sounded by electricity. — *Boston Transcript.*

The Old Mills of Mantua — Writing on some remarkably ancient mills at Mantua, which was a flourishing city in the Middle Ages, a correspondent of the *Miller* says: "Mantua stands on two lagunes, and between the upper and the lower of these a dike was constructed 700 years ago, and pierced with a number of arches. Over twelve of these arches are, and have been ever since the dike was made, twelve mills named after the twelve apostles. Each mill bears in front, over its entrance, a statue of an apostle, while a figure of Christ occupies a central position in the middle of a long line of statues. The water flows with great force along the dike to the lower lagune, and for the last 700 years this stream has served to grind the corn for the feeding of the multitude around." Presumably the roller milling system has not yet reached Mantua. — *Scientific American Supplement.*

Heart-burials. — The body of Louis IX, after his death at Carthage in 1270, is related to have been boiled in wine and water in order to preserve it for transportation, and it was then shipped by Charles of Anjou (I) to Sicily. Here the flesh and viscera were deposited in the Benedictine Abbey of Monreale, near Palermo. The heart and bones remained, by desire of the soldiers, in the camp. Later, his son Philip (le Hardi) having carried them and those of his brother Tristan into Italy, they were brought to Paris in 1271. On March 21 of that year the bones, reduced to ashes, were deposited temporarily in Notre Dame, whence they were presently borne in state to the Benedictine Abbey of St. Denis, and at each spot by the way where the bearers paused, seven in number, Philip subsequently caused a cross to be raised. Charles of Anjou, dying at Foggia, 1285, his heart was sent to Angers, while his body was entombed in San Gennaro, at Naples. His viscera remained in the Duomo at Foggia. Philip II (le Hardi) died of pestilence at Perpignan, October 5, 1285. His flesh was buried at Narbonne. His bones were transferred to St. Denis. His heart was given by Philip IV (le Bel) to the Dominicans of Paris. — *Notes and Queries.*

Cross-Lighting. — Some traditions die hard, being accepted without examination by nine persons out of ten and by all who are in or under authority and, like officials generally, opposed to or suspicious of innovation. Among these is the belief in the hurtfulness of cross-lighting. This method of lighting would seem only to be held injurious in schools, for in our own houses we are only too pleased if we can have windows on two or more sides of a room. Even in Germany, where statistics and experimental investigation pervade every department of administration, and where in each detail the executive is guided by an order in council somewhat inappropriately called an "Erlass," we find cross or double lighting still expressly condemned. Yet Cohn and Förster, Javal and Ferrand, Rumbold and a Royal Commission on School Construction have urged the groundless nature of the prejudice. Provided always, that the eyes are not dazzled and that no shadow falls on the reading or writing, it is impossible to have too much diffused daylight or its artificial equivalent. The loss of intensity with increasing obliquity of the rays of light is acutely felt in wide rooms, especially when not high in proportion, on the side opposite the windows; whereas, if there be windows or lights on each side, the intensity of illumination is equalized and its total amount doubled. It is only necessary that that coming from the right should be naturally or artificially the weaker, as by having the windows north and south or by filling those on the right with clouded glass. Windows in front are always objectionable, but light from behind, if not so strong as to cast a shadow, can but serve to increase the illumination derived from the proper quarter. As Cohn and Förster long since pointed out, reading or other work demanding clear but effortless vision is, in the open air when the sky is overcast, a real luxury. Under these circumstances the light is ample but shadowless; it comes from everywhere, but from no one quarter more than from another. The most perfect artificial illumination conceivable is that obtained by Hrabowski's arrangement of hemispherical milk-glass reflectors with prisms and mirrors by which the light of an electric arc lamp is diffused equally throughout the building, though the source is hidden from view. The light is photometrically equal to that of a clear summer day and as free from color; it is almost shadowless and is, in fact, superior to daylight in not being liable to fluctuations, although its intensity can be regulated at will. — *The Lancet.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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OCTOBER 24, 1896.

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WE hope that such of our readers as desire to appear as candidates in the examinations for positions in the Supervising Architect's office at Washington have duly filed their application blanks. If not, they should do so without delay, as the examinations begin October 28th. Application blanks must be obtained from the United States Civil Service Commission, Washington, D. C., and filed, after being properly filled out, at the office of the Commission. The positions open are those of Junior Architectural Draughtsman, Architectural Draughtsman, Structural Iron Draughtsman, Heating and Ventilating Draughtsman, Computer and Senior Architectural Draughtsman, the salaries ranging from six hundred to two thousand dollars per annum.

WILLIAM MORRIS, one of the most remarkable men of the present age, died in London on October 3, in his sixty-third year, leaving behind him a curious memory, as of an artist who could not paint, but who did more toward the advancement of art than any Englishman of modern times; a rich capitalist and employer of labor, who preached that capital was a crime; and a Socialist of extreme, if not revolutionary views, who, nevertheless, attracted the most conservative people by the beauty of the ideals which he hoped might some day be realized. Morris was the son of a well-to-do merchant, and was educated at Marlborough School, and at Oxford. On leaving college, he studied painting, and also architecture, but abandoned these arts for literature. After he had won fame by the publication of the "Defense of Guenevere" and other poems, he returned to his early love, and, in connection with Rossetti, Burne-Jones, and Ford Madox-Brown, and some others, established a factory for the designing and production of artistic objects, such as wall-paper, stained-glass windows, printed and woven fabrics of cotton, silk and wool, carpets, furniture and so on. This enterprise met with great and deserved success. Morris himself was the general manager of the business, but, at the same time, furnished designs for portions of the work, pursuing this comparatively humble employment until within a few weeks of his death. No architect needs to be told how deeply the Morris manufactures modified and developed the public taste in matters of decoration. Although use was probably made of Oriental ideas in combining colors, the Morris designers, as a rule, held faithfully to nature as a source of inspiration, and they had their reward. Many of our readers are probably old enough to remember the first appearance of the famous "Daisy Carpet," which came out in 1864 or 1865. Up to this time, the designs of carpets had consisted mostly of vast bouquets of gigantic roses, tied with knots of Brobdingnagian ribbon, or of imitations of the beautifully colored, but expressionless, Oriental rugs. To a market brought up on such artistic aliment, Morris & Company offered a carpet of dull greens, sprinkled with little pink and white spots, just as the green English meadows are sprinkled with pink and white daisies in May; and, to suggest more vividly the soft turf, the green ground of the carpet was covered with raised clusters of lines, suggesting the tufted growth of grass. Novel as the carpet was, it was a true work of art, fulfilling the object of a work of art by suggesting to the mind the feelings incident to walking over a daisy-covered meadow; and it received immediate recognition. The demand for it was enormous. It was used not only for carpets, but for hangings, and was counterfeited by carpet-weavers all over the world. The area of flooring covered by it or its imitations must have extended into the thousands of acres, and it is probably still kept in stock; or, if not, it ought to be, for no carpet has ever been produced, before or since, which, to our mind, can compare with it.

THE Morris Company was accused by its competitors, many of whom made their appearance after the first great success of the firm, of repeating its designs too frequently, but the care with which they were prepared made it necessary to use them to the best advantage, and the firm probably profited by the familiarity which the public soon gained with its work, while the public was none the worse off for seeing beautiful things often. By degrees, however, the peculiar coloring of the Morris stuffs, and the style of pattern, were imitated, with or without variations, until the whole system of English textile design was changed, and the impulse given to the artistic movement which has lasted until now.

THE commission sent to Mexico by the Chicago Trade and Labor Assembly, to investigate the condition of workingmen in a silver-standard country, has returned, and made its report. According to this, the commission found Mexico a much less delightful country for working-people than for the speculators who employ them, and who find a very substantial profit in paying their operatives low wages in silver, and selling their cottons or other products at the price of similar goods imported from gold-standard countries. In Guanajuato, where the commission compiled a schedule of wages, tailors, waiters, teamsters, plasterers, laborers and bakers receive from thirty-seven and one-half cents to fifty cents per day; bricklayers, stone-masons, carpenters, painters and street-car drivers get seventy-five cents a day, and iron-moulders and barbers earn eighty-seven and one-half cents. These wages are paid at the silver standard, while imported goods, and native goods which can be sold abroad for gold, are priced by the gold standard. The consequence is that the Mexican workingmen and their families live in what our citizens would consider abject misery. Their houses are usually adobe huts, containing one room, with a mud floor, on which all the members of the family sleep together, wrapped in shawls or blankets. The miserable pittance that the head of the household earns is just enough to keep them all from starving, and the gentle, unambitious Mexicans are satisfied with this. What the Chicago workingmen on the commission thought of it is sufficiently indicated in the closing sentence of their report, in which they say that "the American workingman is a prince compared to the workingman of Mexico."

THE frankness of this expression accords well with the straightforward and unsparing comparison of wages which the report makes; and the document will undoubtedly be widely read. It is to be hoped that similar statistics may be gathered in the same way from other silver-standard countries, but the fact that in Japan, where there is at present an enormous speculative activity in manufactures, and railway and other works, an earnest appeal has just been made to the Government in behalf of the operatives in the cotton-mills, where, it is declared, young children are kept at work eleven

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hours a day, indicates that the conditions there resemble those which prevail in Mexico. Curiously enough, although the Chicago workingmen have had the good sense to wish to learn for themselves the condition of their fellows under a silver-standard, and are not likely to be attracted by the picture, it is said that every professed "labor organ" in the country advocates the free coinage of silver, that is, the silver standard for the United States. Why these periodicals should unanimously support a system which appears to favor speculators at the expense of workingmen, it would be interesting to know; but, fortunately, the true workingmen of this country have begun to discover how little their real interest concerns the heartless schemers who get their living by pretending to be "friends of labor."

THE examinations for the Lazarus Scholarship for mural painting will begin in New York, November 2d. The scholarship is given for three years, and an income of a thousand dollars a year is attached to it. The recipient of the scholarship is required to spend the first two years of the term in Italy, sixteen months to be passed in Rome, and eight months in other parts of the peninsula. The scholarship is open to any unmarried male citizen of the United States. The preliminary examinations cover perspective and artistic anatomy, and each candidate is required to paint a nude figure from life. Those candidates who pass the preliminary examinations in a satisfactory manner are admitted, a week later, to the second examinations, which include the history of architecture; freehand drawing from memory, of Classical and Renaissance ornament; freehand drawing from memory, of the architectural orders, and elementary French and Italian; and each candidate must submit a sketch for a mural figure-composition, with an ornamental border. The candidates selected in the second examinations will be allowed until November 28th to carry out their sketches into fuller development; and the final award will be made from these, by majority vote of the jury; with the reservation that the jury is empowered to declare all the work unworthy, and to withhold the scholarship until next year. The committee in charge of the scholarship includes Messrs. Frederic Crowninshield, J. Carroll Beckwith, Edwin H. Blashfield, Will H. Low, George W. Maynard, C. F. McKim, H. Siddons Mowbray, Walter Shirlaw and Edgar M. Ward.

ACCORDING to *La Construction Moderne*, which has been reading an article on Ruskin, by M. Robert de la Sizeranne, which appeared in the *Revue des Deux Mondes* last June, there is danger of an outbreak of Ruskinism in France, where the ideas of the great Englishman on art and nature appear to have fallen, rather late in the day, on receptive soil. We are inclined to think that the Ruskin cult in France would be materially chilled by the reading of some of the remarks about Frenchmen in the *Fors Clavigera*, but the wanderings dignified by that name are hardly worthy of serious attention, and the noble thoughts on things in general contained in Mr. Ruskin's earlier books would hardly be anywhere better appreciated than among the sympathetic and ardent people of Republican France. *La Construction Moderne* says that the "*Seven Lamps of Architecture*" is the only work of Ruskin on architecture, "current opinion" not having encouraged him to write anything else on the subject. This is, of course, an error. The "*Lectures on Architecture and Painting*" contain the most ridiculous of all Mr. Ruskin's deliverances on architecture, for which the author himself apologized, later, saying that he had not understood the difficulty of the work that he criticised; and the "*Stones of Venice*," the most delightful, to us, of all Mr. Ruskin's books, is a treatise on architecture of the most valuable kind, containing a multitude of facts, recorded with modest fidelity by one of the keenest and most sympathetic observers of the age, and enlivened by *à priori* speculations which, however fantastic they may seem, are full of suggestion and inspiration.

WE do not know how likely French architects are to read much of Ruskin, but, if a suggestion would not be unwelcome from an American brother who is tolerably familiar with everything that he has published, we should say that, next to the "*Stones of Venice*," the "*Aratra Pentelici*" is likely to be most useful to the profession. Although strictly a book on sculpture, its suggestions in regard to that art are just those which architects need most, and can best understand; and the principle which it lays down at the outset, that sculpture is primarily the art of producing an agreeable roughening of a surface, is the very key to the successful application of sculpture to architecture. Another very practical and useful book is the "*Elements of Drawing*." We should hardly dare to guess how many copies of this work we have presented to our pupils and draughtsmen, and, for architectural drawing and sketching, particularly, its series of exercises, faithfully followed, gives a better preparation, in a shorter time, than any course of instruction that we know. Mr. Ruskin, himself, it must be remembered, was the favorite pupil of Turner, and was himself for many years one of the best draughtsmen in Europe, so that his teachings are the fruit of great skill, analyzing its own work with the highest intelligence. After these, if the professional reader makes his art a matter of conscience, as most Frenchmen do, let him read the "*Two Paths*," not for practical suggestions, but for the moral inspiration which it contains, an inspiration which, applied to other things than art, is to be found again in those noblest of books for young people, the "*King of the Golden River*," the "*Ethics of the Dust*," and "*Sesame and Lilies*." Whatever doubts we may entertain of the value of Mr. Ruskin's essays in political economy, or of some of his later criticisms of people and things, the greatness of his artistic and moral ideals must always make his earlier works precious to artists; and if the French artists are, as some people think, in need of a fresh impetus to keep them from falling into inanity, they could hardly go to a better source for new inspirations.

ANOTHER high-building trouble has come up in Philadelphia. A man named Deakyns bought a lot in the business part of the city, and had the title insured by the Real Estate Title and Trust Company, and then went on to build an addition, increasing the height of the structure. As it happened, an old deed of the land contained a clause, restricting the height of buildings to be erected on it. Deakyns's new addition carried his building above the prescribed limit, and some one, knowing of the restriction, petitioned the courts to have the building reduced to the authorized height. As a result of this, Deakyns was compelled to take down and remove the upper part of the structure, at a cost of about twenty-five thousand dollars, and he now seeks to recover this sum from the Title and Trust Company. What the defence will be remains to be seen, but the idea that a title-insurance policy protects the insured against the consequences of violating the conditions under which he holds his land is a new one. In many cases, the courts will set aside conditions in deeds, when they are no longer applicable to the circumstances; and a consideration of this kind would add a fine confusion to such a controversy.

AN interesting application of the principles of forest management was recently made to a region in Bohemia, known as the Runsengebiet, or, as we may translate it, the Gully District. This district forms part of an elevated region, presenting a formation of soft sandstone, traversed by a brook, which, in times of storm, is swollen to a torrent. The effect of the erosion caused by this torrent, as well as that due to the tributary brooks, is to cut the sandstone rock into many deep gullies, and to carry vast quantities of sand and mud into the fertile valleys below. The necessity for checking the latter became so pressing that in 1891 an appropriation was made for works to remedy the trouble, and the matter was placed in the hands of the Section of Torrent-Regulation of the Imperial Forestry Department. The first thing done was to try to interrupt the flow of the sand-laden storm waters by making bars or terraces at short intervals across the bed of the stream. In a few cases these bars consisted of strong stone walls, but, as a rule, the barriers opposed to the water were made of bushes, partly planted in the ground, and partly woven together, and in many instances a simple layer of turf was considered sufficient to hold back the current. Grass seed was sown, for the sake of economy, in places where it was not likely to be washed away, and the whole was left to itself. In a very short time the grass had spread, protecting the sand banks under it, so that larger plants could take root. These, in turn, still more consolidated the soft ground; and at the end of 1895, four years after operations were begun, sixty-four of the gullies were securely covered with grass and shrubbery, and nearly four thousand acres of land, once exposed to ruin from the sand-laden waters, were protected from danger.

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HISTORY OF THE UNITED STATES CAPITOL.[1]—VIII.



Fig. 53. George Blagden, Superintendent of Stonework.

BULFINCH was employed during 1826 and 1827 in charge of what is called new work and in landscape work on the grounds. The latter had reference to designs for the steps and approaches made necessary by the hill on which the Capitol stands. The sculptors were actively at work.

June 4, 1826, while Bulfinch was away from the city, the Commissioner wrote to him saying, "We have met with an irreparable loss — Mr. Blagden was killed last evening at the falling of the bank at the south angle of the Capitol." (Fig. 53.)[2]

We learn from Robert Mills that the original design for the Senate Chamber had an upper gallery on the east, supported by an attic colonnade. But because this obstructed the light, it was removed in 1828 and a light circular gallery on the west was erected.

Although an Act was passed May 2, 1828, abolishing the office of architect of the Capitol, Bulfinch held his position until the end of June, 1829.

[From J. Elgar to Charles Bulfinch.]

WASHINGTON, D. C., June 25, 1829.

Sir, — I am directed by the President to inform you that the office of Architect of the Capitol will terminate with the present month.

Respectfully, I remain

Your faithful and obedient servant, J. ELGAR.

Bulfinch sent a memorial to President Jackson, saying that the building was not in a condition to leave it without the supervision of an architect. He inferred from Act of Congress (March, 1829) and the statement of the Congressional Committee that he would be retained until the work was complete, which he thought would be sometime in September, 1829.

He ends his memorial as follows:

"I most respectfully suggest, that if the President should think proper to recall his orders, and continue my employment for another quarter, it would ensure the right execution of the work; it would gratify my feelings, in closing my labors, with satisfaction, and my time would be at the command of the Government to visit the Navy hospital at Norfolk, if the public services should seem to require it, and to make inquiry into its actual situation, and report of the proceedings there as might lead to more correct prosecution of the distant works in future.

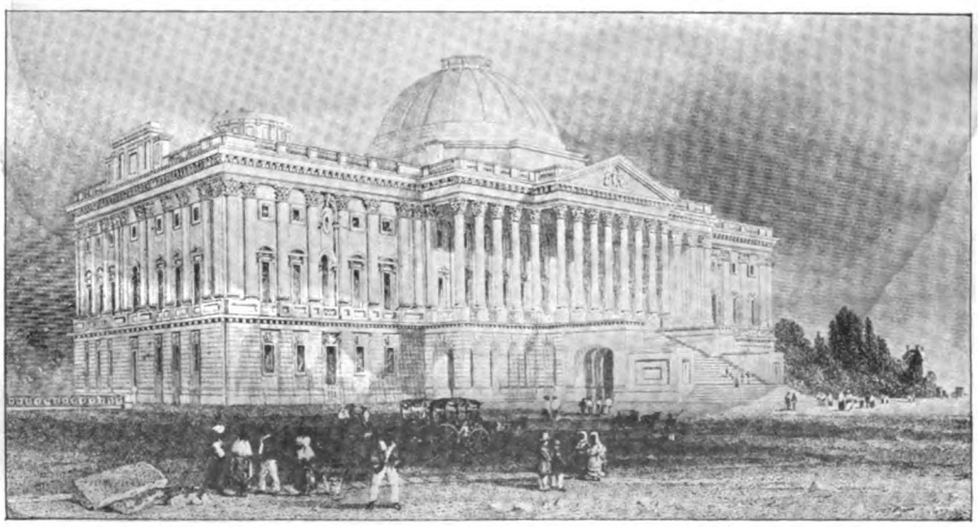


Fig. 54. Western View of Central Portion of the U. S. Capitol, designed by Charles Bulfinch.

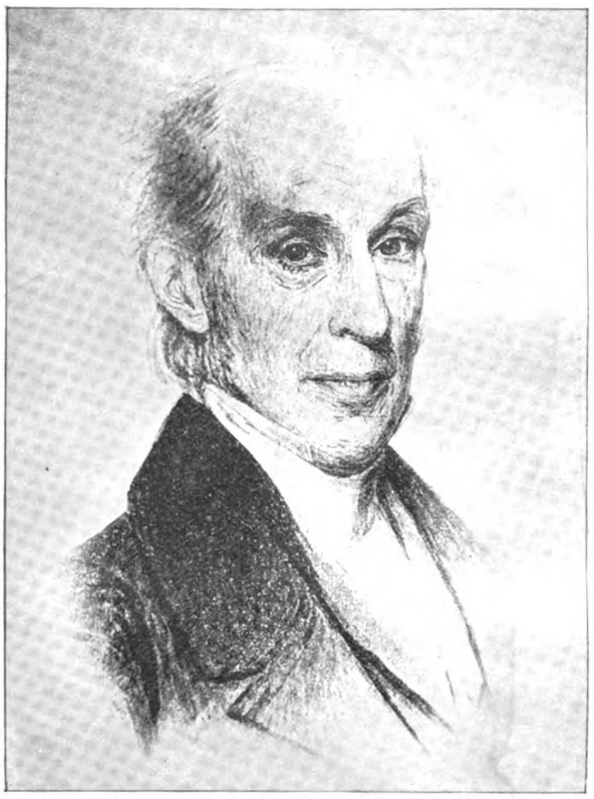


Fig. 55. Charles Bulfinch, Architect.

"The above is respectfully submitted to the consideration of the President of the United States, by one who feels a pride in his profession, and who would regret the appearance of censure more than the loss of the emoluments of office.

"With great respect, CHARLES BULFINCH,

"*Architect of Capitol of the United States.*

"June 27, 1829."

President Jackson answered as follows:

WASHINGTON, June 27, 1829.

Sir, — Your note of this morning has been received. As the law under which you have been employed makes the period of your services depend upon your necessity, it became the duty of the President, as soon as he was advised that the public buildings had so far advanced as no longer to require them, to notify you accordingly. But it was far from his intention in so doing to manifest the slightest disapprobation of the manner in which you had discharged your duties. The superintendent of the buildings had reported that they were so far advanced as not to require the employment of the architect. Of course, the President whose duty it is to guard against a wasteful expenditure of the public money, was bound to direct his discharge.

[1] All rights reserved. Continued from No. 1084, page 6.

[2] Geo. Blagden came from England to the United States before 1794, and he was employed on the Capitol from that date until his death, as superintendent of stonework and quarries.

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Your suggestion in regard to the work at Norfolk will receive the most respectful consideration.

Your obedient servant, ANDREW JACKSON.

After his connection with the Capitol ceased, Charles Bulfinch[1] (Fig. 55) evidently remained in Washington about a year. Ashton

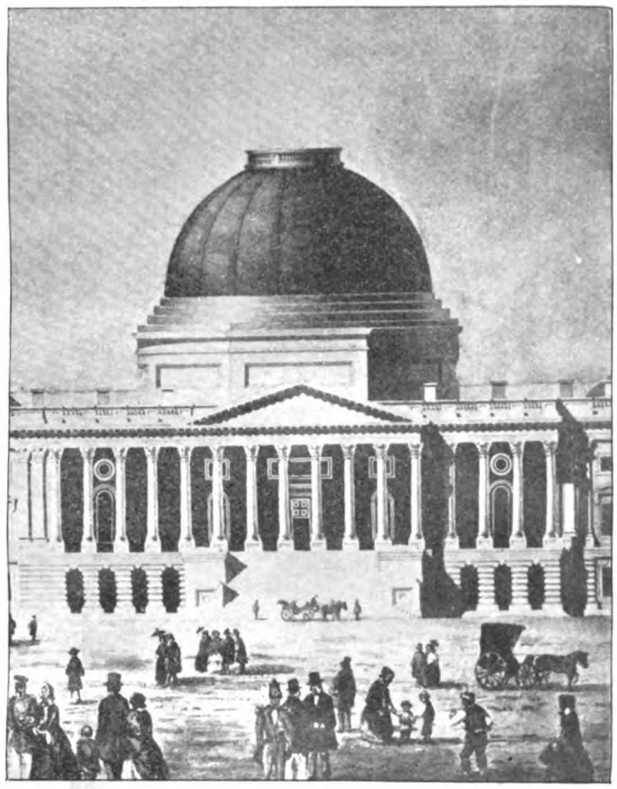


Fig. 56. Bulfinch's Design for Dome, as finished.

R. Willard, in the *New England Magazine* (1890), quotes from a letter of Bulfinch in the possession of a member of his family, written June 3, 1830: "I date from this place [Washington] for the last time. We have taken places on the stage and leave for Baltimore at two o'clock. We have not time to regret at leaving friends. . . . and a place which has given us a pleasant and respectable home for twelve years, and where we leave memorials of us which we trust will long endure." [2]

Charles Bulfinch designed and planned the modified form of the western extension of the building as finished (Fig. 54), made slight alterations in the interior arrangements of the wings, the galleries in the Senate Chamber being one of the changes. Otherwise he carried out Latrobe's ideas according to the drawings. He planned the terrace on the east, with rooms beneath. He altered the form of the dome, making it much higher than it had been indicated on either Thornton's or Latrobe's drawings (Fig. 56).

The three men who deserve credit for the rebuilding of the old Capitol, as assistants to the architect, were Peter Lenox[3] (Fig. 57), Clerk-of-works; George Blagden, superintendent of stonework and quarries, and Giovanni Andrei, in charge of the carvers and sculptors.

In 1822, each received a salary of $1,500 per annum. Blagden was killed in 1826. Andrei died in December, 1824, on which occasion Bulfinch paid a high tribute to his merit. Congress allowed $400 to send Andrei's family back to Italy, according to agreement.

Francis Iardella, who came from Italy to work on the Capitol in 1816, succeeded Andrei, April 25, 1825, at $1,250 per annum.

It seems proper to give here a recapitulation of the facts in reference to the men in charge and result of their work in the building.

That a structure as interesting and harmonious as the old Capitol proved to be, should have been produced, when we consider the various hands through which it passed, is remarkable. This was due both to the skill of the architects employed, and the determination of the many Presidents, who took a personal interest in the work to see it executed, if not in strict conformity, at least in harmony, with the original design.

Hallet and Hadfield were both discharged by order of General Washington, because they persisted in attempting to introduce changes in Thornton's scheme.

No changes were allowed until Latrobe's entrance into office, and the only material change he made in the plans or elevations was on the eastern and western central porticos, Jefferson insisting that everything should agree with the original design. After the destruction of the building by the British, in 1814, Latrobe changed completely the interior of the south wing or old Hall of Representatives, but over this Madison held a restraining hand.

Bulfinch can only be credited with planning and designing the western central portico, and the terraces and landscape work, as shown in the steps leading up the hill.

The result produced is to be attributed to the employment of the most skilful architects that could be obtained in the country, combined with the good conservative judgment and personal interest of such cultivated men as Washington, Jefferson, Madison, Adams and Munroe.

Thornton, Latrobe and Bulfinch deserve the distinction of being the architects of the building. Each designed and planned. Of the three, Thornton deserves the greatest praise, as the originator; Latrobe next, doing much original work in detail as well as planning and general arrangement. Bulfinch executed Latrobe's drawing, with the exception of the western portico as noted above. Hallet, Hadfield and Hoban were simply employed as and were called "superintendents," and deserve probably less credit than Lenthal and Lenox, who were called in the documents of the day, "clerks-of-work" or "principal surveyor."

Thornton showed an appreciation of the needs of the American people, and a confidence in the growth of the country, which his



Fig. 57. Peter Lenox, Clerk-of-Works.

contemporaries did not appreciate, and his original plan was materially curtailed in scale and material under his direction. Latrobe, when he was employed, made changes which could not be considered as satisfactory as the original design.

He left out the grand semicircular portico on the west, and changed the form of the Hall of Representatives from an ellipse to semicircular ends with parallel connecting lines, and omitted the

[1] Charles Bulfinch was the first architect of the Capitol born on American soil. Adino Bulfinch came to Boston in 1681. His son, Thomas, was educated as a physician in Paris and practised successfully in Boston. A second Thomas, son of the first, also a physician educated abroad, was the father of Charles Bulfinch, who was born in 1763, graduated at Harvard, 1781, and received his professional training in Europe. He returned to Boston, 1786, when he began the active practice of his profession.

He soon became the foremost man in his profession in New England. He built many residences and business buildings in Boston. Among the churches he designed were the New North Church, Hanover Street, the New South Church and Hollis Street Church in Boston; the old Unitarian Church in Washington; the Unitarian Church, Lancaster, Mass.; Meeting-house, Charlestown, Mass. The old Boston Theatre was also his work.

Among the many public buildings of which he was the architect may be mentioned the old Court-house and City-hall, Boston; enlargement of Faneuil Hall; Court-houses at Cambridge and Worcester, Mass.; Massachusetts State Prison, Massachusetts General Hospital, McLean Asylum, University Hall, Harvard; State-houses at Augusta, Maine, and Boston. His connection with the Capitol is given in the article above.

In 1817, Bulfinch was Chairman of Selectmen in Boston. He died in Boston, April 15, 1844.

[2] See *New England Magazine*, November, 1890, "*Life and Letters of Charles Bulfinch*," by Ellen S. Bulfinch. 1896.

[3] Walter Lenox, whose father came from Scotland early in 1700, married Miss Carter in Williamsburgh, Va., where Peter Lenox, their son, was born, March, 1771. (Fig. 57.)

His father's property was destroyed and lost in the Revolution. He came to Washington in 1792. He was Clerk-of-works on the President's House and finally on the Capitol. In the War of 1812, he was commissioned a Captain. By investments in real estate and private business he became wealthy before his death in December, 1832.

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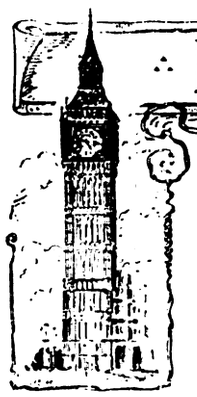
grand staircases in prominent view, relegating them to out-of-the-way corners where only those familiar with the building could find them.

His curtailment of the number and size of entrances to the rotunda was also unfortunate. He, however, made the eastern portico more imposing, but it is a question whether it is as thoroughly in harmony with the building as the original portico. This change made the western the principal front, whereas the most imposing design should have been towards the east, where it shows from the river and city, and overlooks the broad expanse of country toward the President's House and Potomac River.

Bulfinch by his alteration gave a better plan for the central western part of the building, without improving on Latrobe's design.

GLENN BROWN.

[To be continued.]



LONDON

WILLIAM MORRIS AND HIS WORK. — THE ARTS AND CRAFTS EXHIBITIONS. — ILLICIT COMMISSIONS. — THE NATIONAL PORTRAIT GALLERY.

IN the death of William Morris, not London alone, nor England, but all the world has sustained the loss of one of the most remarkable men of the century. For some months he had been ailing and in spite of a sea-trip to Norway in search of health, and in spite of the efforts of medical men, he gradually sank and after three days' unconsciousness, died peacefully, at the age of 62, on October 3d. Until within a few days of his death, and as long as he retained his faculties, he continued his work, completing on September 8th the dictation of a romance upon which he had been engaged, and from that time, as he was able, proceeding with his book illuminations. Poet, designer, craftsman — in a word, artist, combining also in his character a strong element of socialism, he possessed that individuality which transforms and stamps all that a life of energy can bring into contact with it. Of his very varied types of work it is beyond my province to notice in these columns other than those having a direct bearing upon art. Educated at Marlborough and Exeter College, Oxford, he at first contemplated seeking Holy Orders, but eventually abandoned this intention, perhaps at that early age foreseeing a life of productive art, and relishing the attractions of manual labor and the keen joy of the creation of the beautiful. But it appears probable that his early years were of an unsettled nature and without a very clear line of guidance. He turned towards painting, and afterwards was articled to the great Gothicist, Mr. George Edmund Street, R. A. He did not, however, carry out his articles. His poetic gifts and attraction to mediævalism drew him aside from architecture into wider and freer fields of idealism. His successes in literature introduced him to printing, and his own enthusiasm coupled with the influence of Ruskin, Dante Gabriel Rossetti and Ford Madox-Brown, produced as the first declared work of his life the Kelmscott Press. The influence of William Morris's work on the printing and making of books has been felt all the world over. Paper, type, arrangement, illustration, ornament and binding of modern books of the best type all bear marks of his influence. Contrary to his main principle, that only that which is appropriate and useful can be beautiful, his "style" has been plagiarized far and wide, at times with extravagant and ridiculous disregard of conditions; but his worth and merits in this branch of work are not on this account the less to be acknowledged. His connection with the handicraft of book-making was, perhaps, the one of which the world is least cognizant. As a poet, Morris is well known; the Morris wall-papers are a household word; and as a designer and craftsman in furniture and fabrics, ecclesiastical and domestic, he is famous. This is due, perhaps, to the facts that the books which he produced were always costly, sumptuously bound and luxuriously finished. And a curious matter of comparison in this connection, between Morris and Whistler, has been pointed out: the former was in views a democrat, but his works were entirely beyond the reach of the poorer classes who, for the greater part, probably do not know him as an artist; while on the other hand, Mr. Whistler, who is an aristocrat, obtains his most masterly effects from simple and inexpensive mediums.

In 1863, William Morris joined Burne-Jones, Madox-Brown, Rossetti and three others in an establishment in Red Lion Square, Holborn, for the production of stained-glass and wall-papers. At first the scope of the work was small, but with remarkable speed the movement became known and was very rapidly enlarged. Looms for tapestry were set up at Merton Abbey, near London; and at Hammersmith, and in many a studio and workshop in London is now produced furniture of all kinds, leather and metal work, textile fabrics and every type of decorative medium. The headquarters and show-rooms in Oxford Street of the firm Morris, Marshall, Faulkener & Co., latterly entirely in the hands of William Morris, form a source from which issue a large part of the richest and worthiest, albeit expensive, furniture and decoration of to-day. But though his work was thus spread over a large area, and in quantity was so considerable, he was ever watchful of the progress of every detail; he possessed a most remarkable memory, and was himself a master craftsman, constantly working with the tools appropriate to the many crafts he followed.

As a socialist, William Morris was not very widely known. Englishmen have steadily refused to notice any efforts which he may have made in political matters. He favored the nationalization of land and the levelling of the classes. But he cannot be said to have been a leader of socialists; his socialism was always rather a protest against the commercialism and sordidness of to-day than a genuine leaning towards the extended brotherhood of man. But though the result was less marked, into his socialism he threw the same energy and thoroughness which characterized all his actions.

It might be interesting to speculate on what William Morris would have done for architecture had he completed his articles and proceeded to practise. There is no doubt that his strength and virility would have appeared in every work he undertook, while his desire for beauty throughout would have rendered his detail fresh, appropriate and thoughtful. But perhaps his nature was of that unbending form that as a business man he would have met with poor success; at any rate, it is certain that the love for mediævalism, which was so great a part of him, would have tinged his work as architect, and in this sense, at least, he would have proved a worthy pupil of Mr. Street's, revelling in his beloved thirteenth-century atmosphere. Of Wren and all Wren's work William Morris had a low opinion and would ever find hard things to say of St. Paul's, whether of the interior or exterior. Yet, not a little inconsistently, he lived and rejoiced for years in a house obviously bearing the stamp of Wren's influence. A thorough faith in himself and contempt for consistency were very noticeable traits in his character.

Thoroughly to realize the importance of the movement which William Morris inaugurated, it is necessary to call to mind the final condition of poverty to which all design and disposition of texture and color had descended when Mr. Morris began work. It was just the period, between about 1830 and 1860, when furniture and decoration had reached its most dismal and repulsive condition. Into a time when all was dull, colorless or hideous, he introduced a new tradition, that not in a picture-frame or cabinet can the internal beauty of a house be concentrated, but that it may and must extend to its every nook and corner. And if his work strike a note of affectation or eccentricity at times, it must be borne with for the sake of the endless beauties of color and form to which he has introduced us.

A man of boundless energy, dogmatic, resolute to obstinacy, hopeful, persuasive, he had no lack of followers who hailed him master and formed his school. He disclaimed the impeachment that he was one to lament the past, despise the present, or despair of the future in art: yet to mediævalism he was almost entirely surrendered; it was his faith and his deliberate choice. "If a man wants to do anything beautiful," he said, "he must just choose the epoch which suits him, and identify himself with that — he must be a thirteenth-century man for instance." Here is a subtile distinction of sentiment. He was thought, and thought himself, to be steeped in mediævalism; but the projection of his own soul theron, this alone it was that he and we admired. Knowing it or not, such was his individuality, he proved the word of your great countryman "The world is new, untried. Do not believe the past. I give you the Universe a virgin to-day." So whether his direct influence survive him or fail, such has been his life and such his work.

By a strange and melancholy coincidence the opening of the Arts and Crafts Exhibition, at the New Gallery, comes almost simultaneously with death of its prime mover and president, William Morris. It will be remembered that these exhibitions were begun in 1888, and have for their main object the bringing the worker into direct contact with the purchaser. Its originator hoped in this way that the belief that art is purchasable as an ordinary commodity might, to some extent, be uprooted, that the shop taint might be removed and the individuality of the craftsman might be distinguished from the firm for which he might work. All kinds of materials were introduced and all kinds of craft; and though the exhibition has always to some extent represented the views and tastes of a clique of artists, a great variety of very beautiful work has contributed to render the exhibitions interesting and attractive. It has not been held every year; the present is the fifth; the last was held some three years ago. The collection this year appears to be representative and includes much sound and thoughtful work from well-known hands. But of the precise merits of domestic and ecclesiastical furniture and fittings it is difficult to speak fairly, so long as it is possible to regard them only apart from the position they are destined to fill and for which they are designed. Mr. H. Wilson contributes some very remarkable choir-stalls which have been made for him for his Church of All Hallows, Southwark, but in this case, as with many others, it is the position, the surroundings, the light, the character of the building and other like local considerations which can only determine the exact value as a work of art. With wall-papers, textile fabrics, and small articles generally, this limitation is not so marked, as the conditions of surroundings or backgrounds are more mutable. One of the few contributors who show a total absence of the influence of William Morris is Mr. Hermann Obeist, who is represented this year for the first time, I think. The embroidery which he submits shows a breaking away from the

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conventional, almost geometrical, character usual to embroidery work, and instead, we have a most effective treatment in mass and color. But by far the most important feature of this year's exhibition is a large and most representative collection of cartoons and decorative work of the late Ford Madox-Brown, the true founder of the pre-Raphaelite movement. Such an opportunity has not been given hitherto of studying the work of this great man, and this exhibition may do much to expand the narrow appreciation in which he is held, and attract an acknowledgment of the honor which attaches to his name. On the whole, this exhibition is the outcome and indication of a movement which is more than remarkable — it is unique in Europe. It is not the passing effort of a few individual artists, but from its flourishing condition has all the appearance of being a permanent record and appreciation of the triumph of craftsmen over manufacturers and of art over business.

A discussion of a somewhat heated character has lately taken place in some of the technical journals, and from thence has been continued in the columns of the *Times*. The subject has been the illicit commissioners of professional men. At a recent business meeting of the R. I. B. A., to which reporters are not admitted, a Fellow who was present was reported in one of the building journals, while making an attack against the Council, to have proceeded to suggest that certain holders of the Fellowship were in the habit of accepting surreptitious commissions. This report naturally produced a sensation when it appeared in print, and the gentleman to whom the sentiments were attributed at once wrote, denying the assertion. Angry letters from many members of the R. I. B. A. followed in the journal in question, and these were accompanied by letters endeavoring to substantiate the charges which were reported to have been made. These latter communications, needless to say, bore as signature mere *noms-de-plume*. Here this matter dropped, so far as it concerned this particular incident. But almost directly afterwards, possibly by coincidence, a correspondence on the subject was begun in the columns of the *Times*. Sir Edward Fry, late Lord Justice Fry, opened this second discussion by calling attention to the recent observations of the Lord Chief Justice on the evils of secret commissions in commercial transactions. Sir Edward Fry attached these observations to the transactions in which engineers and architects are interested, and urged the great and reputable bodies of professional men to make every effort to stamp out the evil. "Is it not possible," he asked, "that the great professions of engineers and architects may bestir themselves, and consider whether something cannot be done to check practices which the honorable members of their callings admit and deplore?" A letter also appeared in the same issue from a large north-of-England manufacturing firm, who stated the difficulties into which this evil brought them. "We have met," they said, "with serious difficulties in connection with some architects, who will demand a commission from the manufacturers whose machinery is used, in cases where they prepare the plans, and who get paid for the same by the owners of the property." Other letters appeared from various sources, some denying and some confirming the statements. A letter from the Secretary of the R. I. B. A. appeared, giving the by-laws of the Institute and the clause of the declaration which every member is compelled to make, that he will not accept any trade discount or illicit commission. The Secretary could not, however, deny, and this is perhaps the most remarkable point in the discussion, that cases had occurred in which "the moral guilt of the parties concerned had been apparent, but upon which no action had been taken, simply because of the absolute refusal of witnesses to give evidence. In other words, because the general public are too willing to ignore their own obligations to society, even where their own protection is concerned." A grain of comfort was introduced by Prof. Roger Smith, who stated that in a large practice during forty years he had never heard of even an indirect suggestion of a bribe from any contractor, and only twice from tradesmen furnishing goods to the building-trades. Sir Edward Fry, however, in a further letter to the *Times*, fastened at once upon the statements of the Secretary of the R. I. B. A., and especially upon the cases in which "moral guilt" was "apparent," but where no definite action had been taken. He then went on to point out the law concerning bribes and bribery. Sir Alexander Rendel followed with a letter somewhat on the lines of that of Prof. Roger Smith, stating that in a practice as engineer of forty years' duration, he had been approached three times only on the subject of a commission, and of these only one was an English firm. "That firm," he adds, "paid dearly for its offence." An anonymous writer in the *Architect* has endeavored to show that the remedy for the evils, if such exist, lies in the hands of the public, who should beware of compelling architects to undertake work at small fees. Sir Edward Fry again instantly fell upon this rather lame letter, and this time in the pages of the *Saturday Review* manifestly feels secure in the statement he has made. Certainly, the attitude of the R. I. B. A., if it was necessary to assume one at all, has not been one calculated to inspire public opinion with a high sense of the Institute dignity, or the wisdom of its management. But so unsatisfactory is the general position of architects in respect to this correspondence, that there seems every probability of the subject being seriously revived when the business session of the R. I. B. A. recommences.

The report of the Trustees of the National Portrait Gallery, the first issued since the opening of the new buildings erected by Mr. Ewan Christian, shows a satisfactory and interesting increase in the public appreciation of the national portraits. But although the new premises have only as yet been opened six months, the Report states that all the available wall-space is already occupied and that extension will be inevitable at some time not far remote from the immediate future. This, it may be mentioned, will not be difficult to arrange, as there is an available site, at present occupied by barracks, immediately in the rear of the National and National Portrait Galleries. The Report further states that the Sunday opening has been completely successful and that the number of visitors on Sundays has exceeded the general average on week-days. No doubt a similar statement could be made with regard to the Sunday visitors to the National Gallery itself. But, however this may be, the Trustees of both buildings have decided that the doors shall not be opened on Sunday during the winter months, and, in consequence, with September the privilege ended. Protests have been made against this rule and petitions are being presented, as it is rightly felt that it is during the dull Sunday afternoons of winter that access to the galleries is most particularly desirable. And if, as is stated, the reason for closing during the winter months is based on the fact that the galleries possess no means of artificial lighting, the question remains pertinent, "Are Sundays in the winter darker than other days of the week?" for of course the galleries are open daily throughout the winter, closing only on occasions of fog or exceedingly dull weather. A rather notable addition has lately been made to the fine collection of portraits painted and presented to the nation by Mr. G. F. Watts, R. A. This is the portrait of the late Lord Leighton. In December, 1895, Mr. Watts offered the Trustees any of his portraits that they cared to accept for the National Portrait Gallery. Seventeen in all were at that time chosen, and Lord Leighton's portrait is the eighteenth painting received by the nation from the hand of Mr. Watts. This remarkable series includes portraits of such men as Matthew Arnold, Robert Browning, Thomas Carlyle, Sir Andrew Clarke, M. D., Sir Charles Hallé, Cardinal Manning, John Stuart Mill, Dante Gabriel Rossetti, Earl Shaftesbury, Lord Tennyson and Lord Leighton. A great art critic once said that "the only portraits in which one believes, are portraits in which there is very little of the sitter and a very great deal of the artist. . . . Most of our modern portrait painters are doomed to absolute oblivion. They never paint what they see. They paint what the public sees, and the public never sees anything." The violence of the contrast between Mr. Watts's portraits and those of most of his contemporaries may easily have suggested to this critic the truth, which he has so bluntly written down.

POLAND'S ANCIENT CAPITAL.

CRACOW, supposed to have been founded by the mythical King Cracus, lies in a plain on the upper waters of the Vistula, near the eastern end of the Carpathians. There are about 80,000 inhabitants, of whom something like a quarter are Jews, the real Polish Jews, who in most cases have kept their old characteristics to an extent that is startling in these progressive times.

In the way of regular sights, such as appeal to the most ordinary tourists, Cracow is far richer than the few meagre pages devoted to it in Baedeker would lead us to expect. Many of the Polish sovereigns and of the great nobles lived magnificently enough, frequently importing artists from Germany or from Italy to supply the deficiencies of native talent. Both influences are well represented. Thus, on the one hand, we come across not only fine examples of Gothic architecture that suggest Danzig, but also splendid specimens of the sculpture of Veit Stoss and Peter Vischer; on the other we can see that Italian taste was prominent even before the marriage of Sigismund I and Bona Sforza (in the early part of the sixteenth century) brought from beyond the Alps men of southern genius, who proceeded to enrich their new home with some really great works of the Renaissance. The glory of the city is the Wawel, the hill on which stands the citadel commanding the town — a castle begun by Casimir the Great, later continued in the style of the Renaissance, with a beautiful *cortile*, but afterwards neglected, plundered of its pictures by the princes of the Saxon line, who sent them to Dresden, and finally turned into a barrack and military hospital by the Austrian government. Adjoining it is the Gothic cathedral, consecrated in 1359, where are to be found most of the tombs of the Polish kings and their families from Ladislas Lokietek (d. 1333), the father of Casimir; but the last sovereign of all, the weak and unfortunate Stanislas Poniatowski, who was deposed by Catherine the Second of Russia, lies buried in St. Petersburg. Many of these tombs rank high as works of art, forming as a whole a series nearly unequalled in the world. The most impressive are three of those in the Romanesque crypt, the oldest part of the church, the three graves of Poland's national heroes, John Sobieski, Kosciuszko and Joseph Poniatowksi, who was drowned in the Elster after the battle of Leipsic. There is another monument to Kosciuszko, a mile or two away, inside a fort on a hill with an excellent view. It is a mound, sixty-five feet high, built in 1820–23 by the efforts of the entire population.

Descending from the Wawel into the streets below, we found much to interest us, and not a little to regret. The old walls were torn down between 1810 and 1820, as were, with one exception, the twenty gates, in place of which we have a promenade that, pleasant as it is, is an insufficient consolation. The heart of Cracow is the great Rynek (Ring) with the brick church of St. Mary, an imposing Gothic building, whose interior has recently been restored in a

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manner which, though it has provoked much criticism, has a certain effectiveness. At any rate, one can turn aside from the fresh paint to admire some splendid specimens of mediæval sculpture and stained-glass windows. In the middle of the Rynek is the Sukiennice, the Cloth Hall, a masterpiece built in the fifteenth century and very satisfactorily restored some years ago; near by it stands the clock-tower, a remnant of the ancient city-hall demolished in 1820. Although fifteen churches were burned to the ground in a great fire in 1850, there are said still to be fifty left, several of them well worth a visit; but far better is the superb Gothic court-yard of the library of the University, formerly the University itself, begun by Casimir III in 1349. For good pictures, we must go to the two fine private galleries, that of Countess Potocka and the museum of Prince Czartoryski, the latter containing a Da Vinci and a Raphael, also a large collection of arms and antiquities. In the cathedral are works of Canova and Thorwaldsen. As regards native modern art there is not very much to be said. The various attempts at neo-Gothic architecture have not been uniformly successful, and in the galleries above the Sukiennice, the average visitor will find little to interest him, except Semiradski's "Living Torches of Nero," and two or three historical paintings by Mateiko.

And yet all these works have their importance, as showing that Poland lives. Cracow is not merely a great Austrian fortress, with fifteen thousand men hidden away in invisible defences round about, nor is it only an ancient capital with the Westminster Abbey of an extinct nation. Its memories and monuments not only make past ages vivid; they spur on the men of to-day. It is the seat of a university, of an academy of sciences, a centre of art and thought, of literary activity and of national life. Even in practical politics the Poles of late years have shown a marked ability. The present Austrian Prime Minister, the Minister of Finance, and the special Minister for Galicia are Poles; so is the Minister of Foreign Affairs for the whole of the dual Empire. As a people the Poles have always been gifted, brave and patriotic; and in this century they have, under the most disastrous conditions, shown an astonishing vitality, a persistency that hardly seemed to belong to their character. Who, then, can maintain that their part in history is over, and that the time has come when we can say with truth, "*Finis Poloniæ*"? — *Archibald Cary Coolidge, in the New York Times.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXIII: GARDEN OF J. C. HOAGLAND, ESQ., SEABRIGHT, N. J. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS; MESSRS. OLMSTED, OLMSTED & ELIOT, LANDSCAPE ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued with the International and Imperial Editions only.]

CONVENT OF THE SISTERS OF MERCY OF LORETTO, CRESSON, PA. MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS, PITTSBURGH, PA.

THE convent is built of Ohio sandstone to the level of the first story, and above that of red brick and terra-cotta laid in white mortar with courses and diaper work in black brick headers. The roof is green slate. Total cost about $150,000.

ENGINE-HOUSE NO. 14, EAST 18TH ST., NEW YORK, N. Y. MESSRS. N. LE BRUN & SONS, ARCHITECTS, NEW YORK, N. Y.

HOME FOR COLORED ORPHANS, ALLEGHENY, PA. MESSRS. NEAL & HOPKINS, ARCHITECTS, PITTSBURGH, PA.

SKETCHES AT NEWPORT, R. I., BY MR. P. G. GULBRANSON, BOSTON, MASS.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXIV: LE PRESBYTÈRE [MARIE ANTOINETTE'S COTTAGE], PETIT TRIANON, VERSAILLES, FRANCE.

PARK BUILDING, REAR VIEW, PITTSBURGH, PA. MR. GEORGE B. POST, ARCHITECT.

A GROUP OF PALACES.

[Additional Illustrations in the International Edition.]

HOUSES IN THE ALTMARKT, STRALSUND, PRUSSIA.

[Gelatine Print.]

THE architect of this fifteenth-century building is unknown.

SCHLOSS WILLANOW, WARSAW, POLAND.

THIS plate is copied from *Zeitschrift für Bauwesen*, as it throws some light on an article published elsewhere in this issue.

COMPETITIVE DESIGN FOR NEW WATER-TOWER, HANOVER, GER. PROF. HUBERT STIER, ARCHITECT.

THIS plate is copied from *Architektonische Rundschau.*

NEW BUILDINGS IN THE HAYMARKET, LONDON, ENG. MR. C. J. PHIPPS, ARCHITECT.

THIS plate is copied from *Building News.*

SOME OF THE BUILDINGS OF THE BERLIN EXHIBITION OF 1896.

THESE views are copied from *Deutsche Bauzeitung.*

"LOVE," A STUDY FOR DECORATION, BY MR. G. WOOLLISCROFT RHEAD.

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OLD HOTEL DIEU, COMPIÈGNE, FRANCE: RESTORATIONS BY M. FLUGEL.

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SKETCHES AT SALCOMBE, ENG.

THESE sketches are copied from the *British Architect.*

A DOOR-HEAD, LUND, SWEDEN: CHAPEL DOOR, PALERMO, SICILY.

THESE illustrations are copied from *Teknisk Tidskrift.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

TRADE UNIONS AND THEIR METHODS.

BOSTON, MASS., October 13, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — We know by your words in the *American Architect*, you are against craft organizations and the progress for which they have been making war. Had your energies been justly used through the *American Architect and Building News* a better condition might have been established at Boston.

Trade Organizations are for progress, though they seemingly lose a battle, yet the war goes on.

Trade Organizations are fighting to escape a slavery as great as ever humans set up.

Cotton Mather was in favor of killing people for being witches and wizards; you are holding as honorable a position when you print tirades against people at war for good progress.

I send you some resolutions, trade organizations have indorsed, that I hope you will publish in the *American Architect and Building News.* Yours truly, A. F. HILL.

22 Milford Street, Boston, Mass.

BOSTON, MASS., October 10, 1896.

Resolved, That it is the opinion of the Building Trade Council of Boston, that the lives of children should be protected in school-houses by having the heating-apparatus of the least dangerous kind, and all the dangerous steam-boilers be removed from under school-rooms or near school-houses.

Steam-boilers of the most dangerous kind has recently been placed under school-rooms at Boston. These boilers are dangerous, as the boiler in use is liable to explode even when in the care of skilled persons, as history of boiler explosions proves to us.

Indorsed by Boston Building Trades Council, October 11, 1896.

BOSTON, MASS., October 10, 1896.

Resolved, That it is the opinion of the Boston Building Trades Council that all school-houses in Boston should be built according to the laws of Boston for a first-class building.

Theatres, hotels, breweries, mercantile buildings, stock exchanges, banks, jails, city and town halls, county court-houses and state-house are built according to the laws for a first-class building, while school-houses for children are not any more safe than a second or third class building.

Indorsed by Boston Building Trades Council, October 11, 1896.

[ALTHOUGH our correspondent is clearly too careless a reader to realize that he is stating falsehoods, or to answer seriously, we will say that when trade unions cease to give cause for the publication of such statements as

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the two which follow, it will give us pleasure to believe that all the aims and methods of trade unions are good and wholesome, as many of them even now certainly are. — Eds. American Architect.]

"There may soon be two civil suits entered in the Newark courts by Charles W. Speer and W. R. Thompson, stone-cutters. Their case shows the peculiar oppression of the organized labor. Speer and Thompson worked for Payne & Coelkum, contractors. According to the complaint, Walking-delegate Robert Murray of the Steam Stone-cutters' and Mechanics' Union saw the men recently, and when he learned that they were not members of a union he asked them to join it. They were willing and were told that the initiation was $20. They made application for membership, but were rejected. Then Murray called on the contractors and demanded the discharge of the two men. The contractors refused at first, but when a strike was threatened, they dismissed them. Late yesterday the men called on Police Justice Mott and asked whether they could bring criminal proceedings against Murray. The justice postponed the case until to-day and then advised that civil suits might be brought. The men are married. The action of the union debars them from earning a living at their trade, for the master masons are all union men." — *N. Y. Evening Post, October 16th.*

"The trial of a suit of especial interest to labor organizations and to workmen not members of unions was begun yesterday before Justice McCarthy and a jury in Trial Term, Part II, of the City Court. The question involved in the action is the right of labor organizations to boycott their members.

"The suit on trial is brought by Joseph Connell against George Peacock, president of the Journeyman Stone-cutters' Association of New York, Jersey City, East Chester and vicinity. The association has a membership of more than 1,000 men. The plaintiff, who has been the treasurer of the association, declares that he was out of employment for nine weeks, owing to the action of the association against him. It was brought out at the trial that certain members had demanded that Connell turn over the books to them, in order that they might make an investigation in regard to a certain bill. The witness refused to do this, unless six of his friends were present at the investigation.

"Connell sues for $2,000 damages, and is represented by Alfred and Charles Steckler." — *N. Y. Tribune, October 17th.*

NOTES AND CLIPPINGS

Round Churches. — In ecclesiastical architecture circular and polygonal structures were by no means uncommon among the early Christians, especially for baptisteries and sepulchral chapels. The tomb of Theodoric, or what is now called Santa Maria Rotunda, at Ravenna, is a singular example, having a flattish or segmental dome (about 34 feet in diameter) cut out of a single block of stone. San Stefano Rotundo, Santa Costanza and the rotunda or church of Santa Maria Maggiore at Nocera are works of about the same period. While the last greatly resembles Santa Costanza in plan, having coupled columns placed on the radiating lines from the centre, and with arches springing from them, it differs altogether in section from both those examples, there being no cylindrical wall or tambour above the colonnade, but the dome springs immediately from the columns and the arches groining into it. Consequently, the proportions are much lower, the diameter of the space enclosed by the columns being 39 feet and the height to the top of the dome 42 feet — proportions differing very little from those of the Pantheon. The extreme internal diameter is 78 feet. The earlier edifices of this class are, for the most part, of moderate dimensions, but others were afterwards erected on a larger scale, and among them is the celebrated Baptistery at Pisa, which is externally about 120 feet in diameter and 100 feet in height, exclusive of the dome. Besides being remarkable on account of its style, this edifice presents other architectural peculiarities, one of which is that the central area is covered by a conical roof, the upper part of which is carried up so as to pierce the external dome, and, except that it has no openings, to appear like a lantern placed upon it. Woods, therefore, conjectures that the interior cone originally formed a spire, and that the external dome was an after addition to the structure. The rotunda became afterwards in a manner incorporated with or added to the cruciform plan, being raised aloft and placed over that part of it where the transepts intersect the body of the edifice. Nearly all modern cupolas may be described as rotundas elevated above the rest of the building and viewed by looking up into them from below. Thus, supposing there was a floor at the level of the whispering-gallery at St. Paul's, the dome and space beneath it would form a perfect and well-proportioned rotunda, whose height and diameter would very nearly be the same. In itself alone the rotunda form does not accommodate itself to the purposes of a church; it does not afford space for the possessions and occasional ceremonies required by the Roman Catholic worship; nor is it the better fitted for the Protestant service, since, besides that nearly all its beauty would be destroyed by the floor being covered with pews, it requires an amphitheatrical arrangement of seats in concentric curves. Neither is it a form that can be enlarged to any required capacity, for 140 feet is almost the maximum of diameter that can be adopted for a space to be covered by a dome. Even the Pantheon at Rome, which may be taken as that maximum, is but of moderate size — an area scarcely at all exceeding the core of St. Peter's, the Duomo at Florence, etc., that is, merely the central part beneath the cupola. Rotundas are accordingly rare even in Roman Catholic churches, yet although such structures are necessarily limited by their form to a moderate size, they derive from it also a grandeur which would not be produced by the same scale according to any other plan. Neither grandeur nor beauty, however, results, as a matter of course, from the plan alone, because whatever charm that possesses may be nullified by other circumstances. — *The Architect.*

Swindling with Toy-houses. — Here is the real-estate man's story: "Talk about swindles; the best one I ever came across was down in the State at a town called Bingham, or something like that. The town isn't any good, and never will be, but, just the same, a fellow has been selling subdivision lots. He got hold of a run-down farm lying at the edge of the town, and cut it up into lots. Then at one corner of the tract he built up a toy residence addition to the town. He laid out a little roadway about two feet wide, and stuck up little trees along each side of it. On this road he put some houses, each one foot high. He put in a factory-building that was nearly three feet high, and laid water-pipes about the size of pipe-stems. He had the whole thing photographed, and after the photographer had touched up the picture it indicated a beautiful driveway at least sixty feet wide, with big houses on either side of it. He took these photographs with him when he went on the road to sell the lots. He would say, 'Now, here is a picture of one corner of the subdivision. I have already built twenty houses out there. We have water-pipes laid and the street is gravelled. Your lot is less than 600 feet from the corner of the factory-building here.' You see, he wanted to protect himself in case he was arrested for fraud. The photograph was genuine, and it was true, as he said, that water-pipes were laid and houses built. Of course, he did not take the trouble to explain that the houses were no larger than bird-cages, and the street not much wider than a plow furrow. Well, he traded four of these lots to a farmer for a drove of young cattle. When that farmer went over to look at the lots he was the maddest man on earth. He had the real-estate man arrested for perpetrating a fraud, and I believe they're fighting it out now. The man who sold the lots insists that he told the truth, and backed up his statements with a photograph." — *Chicago Record.*

Climbing for Water! — In the far southwest of America it is a current saying that "the natives climb for water and dig for wood," which, being interpreted, means that water for drinking-purposes is kept in an earthen jar or olla upon the top of the house, where, by means of the more rapid evaporation, the contents of the jar are kept continually cool. The digging for wood is explained by the fact that the only timber through much of that region is the mesquit, a low-growing shrub rather than a tree, the roots of which are very hard and make excellent fuel. The mesquit groves are a striking feature of the wide level expanses of these regions. From a distance they look like peach orchards. Besides producing fuel the mesquit tree bears a bean which is used as an important article of food among the Indians. The bean is produced in pods which are 7 to 9 inches long and of a buff color. They begin to ripen in midsummer, and have the quality of preventing thirst as well as of satisfying hunger. They are often of the greatest value to travellers through that desert country. The Indians who know their value do not hesitate to go a long distance away from water if they are sure of a supply of mesquit beans along their route. Among certain of the less civilized of the southern tribes of Indians — the Cucupahs, who live along the Colorado River in Lower California — mesquit beans form an important part of the winter food supply. The Indian women also make rope and twine of the bark of the tree and weave it into baskets. Horses and cattle also feed upon the beans. There are few regions of the earth so utterly sterile as to be without the means of supporting human life. — *Invention.*

Malmaison. — Malmaison Château, once the residence of the Empress Josephine, has been purchased, together with some of the grounds attaching to it, by M Osiris, a Paris financier and philanthropist, for 132,000*f.*, or £5,280. Other portions of the property were bought by the Comtesse de Bari and by some nuns, while a billiard-table, supposed to have been used by the First Napoleon, fell to an American purchaser for £29. The pine planted by the Emperor and the peach tree which Josephine placed in the orchard still exist in the grounds. The château, which looks like a hospital or a barrack, is, as has already been stated, in a very dilapidated condition. The ceilings are full of holes, the damp has eaten into the tapestries and wall-papers of the *salons* and bedrooms, while in the chapel the altar is half demolished and the sculptured figures are almost unrecognizable. Malmaison was bought for the First Consul in 1798, and cost the Government 160,000*f.* M. Osiris, the new owner, does not intend to prepare the place for residential purposes, but he says that if it can be thoroughly restored he will offer it to the country as an historic place, which may also be utilized for some philanthropic purpose to be decided upon hereafter. The defenders of historic landmarks have now gained a victory, as the threatened demolition of the old residence of Napoleon and Josephine has been obviated by the munificence of M. Osiris. Patriots may also exult, for the purchaser of Malmaison had also, it appears, determined to acquire the place so as to prevent it from falling into the hands of an Englishman. The shade of Napoleon will thus be preserved from coming into contact near the historic pine tree with the substantial figure of some wealthy retired citizen of the so-called shopkeeping nation. — *Paris Correspondence London Telegraph.*

Labor in Mexico. — The most senseless thing that any newspaper can be guilty of, is the comparison of the condition of Mexican labor with that of the United States. Our labor is not, as a rule, as efficient. We do not pretend that it is. Even in cotton-picking the American negro will do four times as much in a day as the Mexican. Agricultural labor here is slow and ineffective. In the mechanical arts the same indolence is noted. So if the laborer or mechanic is not as well rewarded as the American artisan or laborer, it is because he is not worth it. In some industries cheap labor is an advantage. There are mechanical arts, grades of factory labor, where the native labor is as good as foreign, and so, being on a silver basis of compensation, is profitable for the employers. The Mexican laborer and mechanic has not the wants of his counterpart in the United States. He has not inherited those traditions of comfort and physical well-being which are natural in a race accustomed to providing for hard winters and enduring a variable climate. The climatic environment of the workingman here tends to make him easy-going. It is not easy to starve. And, when you think of it, men in northern lands work because they fear hunger and discomfort. When it is easy to get food, and there is no peril from a rigorous winter, men will not work with the same diligence. So it is evident that it is foolish to compare Mexican with American labor, and to print long columns of comparative wages. — *Mexican Correspondence Boston Herald.*

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IT may be questioned whether so much building business was ever held in suspense as now awaits the result of the election next Tuesday. Judging from the unanimous testimony of architects, who naturally know more than any other persons in regard to the early stages of building projects, the work which will, in all probability, be put into the market within the next few months, if Mr. McKinley should be elected, amounts to many millions of dollars. Of course, we have no opinion to express on political questions, but the effect of the present contest on financial and business affairs is a matter of fact, not of opinion. To take one or two examples: the City of Cambridge has had plans made and accepted for two important public buildings, and has authorized the issue of bonds to raise the money to pay for their construction. The bonds cannot be sold, for the simple reason that bankers and other people who would ordinarily buy them are calling in their resources, so as to have plenty of cash in hand to meet a possible season of panic in case of the election of Mr. Bryan, or are lending money on call, at eight or ten per cent interest, on stock collateral, in such a way that they can get it back into their cash-drawers at a day's notice. They cannot be blamed for this, for it is practically certain, as Mr. Bryan himself is said to concede, that his election would be followed by sufficient financial agitation to make it necessary to close the stock exchanges; and the bankers, whose standing depends on the fidelity with which they meet their obligations in cash, and who might be unable to raise money later by the sale of securities, must make provision now for possible contingencies.

IN the same way, the construction of the enormous South Union Station, in Boston, the largest railway station in the world, the plans for which have long been ready, has been postponed. In order to provide funds to build it, the various railroads composing the Terminal Company, which is to own it, had arranged for an issue of bonds, to the amount of six million dollars. The bonds have for some time been ready, the land for the station has been purchased, and mostly cleared, and it was expected that the building would be completed and occupied within a year; but the bonds cannot be sold, for the reason, as before, that the people who have money to buy them are bound in honor to keep it in their cash-drawers, ready to meet the demands of panic-stricken creditors in case of Mr. Bryan's election. It is hardly necessary to point out that the expenditure of six or seven million dollars, within twelve months, on the new South Union Station, the new Cambridge Latin School and the new Cambridge Hospital, would alone be sufficient to make building tolerably active in that vicinity; but there are many more large projects of the same sort, not only in and about Boston, but in Worcester, Springfield and other towns, which are held in suspense in the same way, and for exactly the same reason, — the unwillingness of people who have, together with property, obligations to other people, to run the risk of injury to the latter by locking up cash in enterprises where it will not be available to meet a sudden call. If Mr. McKinley should be elected, and assurance thus given of the maintenance of the present standard of value, and the stability of property, the prospect seems to be that not only the undertakings which have already reached the first stages would be pushed rapidly through, but that many new ones would be brought forward. There is certainly in this neighborhood, and, so far as we can ascertain, at all the other great centres of building industry, work enough waiting for the favorable result of the election to cause a demand for materials and labor which will come very near to exceeding the supply. The inevitable result of this will be to raise prices, and, in building matters, a rise in the prices of materials is generally followed by an increase of building. Just now, particularly, the prices of nearly all materials are unreasonably low, so near the cost of production, in fact, as to afford the dealers little or no profit; and the appearance of a return to a healthier condition of the market is likely to be the signal for a multitude of contracts with buyers anxious to purchase before a greater advance.

THE Chanler Paris Scholarship has been awarded this year to Mr. Lawton Parker, of New York. There were twenty-seven competitors, and the jury compliments the general character of the work submitted, saying, however, that most of the competitors were weak in composition, as is natural enough, this being an accomplishment the very existence of which is suspected by few of our self-taught artists. Mr. Parker received his early training in Chicago, but has been three years in New York, and, before that, is said to have studied two years in Paris, under good masters. With this for a starting-point, his five years' scholarship work in Paris ought to be very profitable, and we may hope to welcome him back as one of the people who are some day to place their country at the head of the artistic world.

SPEAKING of the highest class of American artists, it seems to us that it would be an excellent thing for some one who was not afraid of personal violence, or the objurgations of the newspapers, to get together a collection of works by the real painters of America, such as Charles Sprague Pearce, Picknell, La Farge, and a score of others, whom we will not attempt to name, and show them to people in their own country. It is not creditable that the painters of the "Route de Concarneau," or the "Paradise Meadow," should be better known, and more honored, in Paris than in New York or Boston, but there is a certain excuse for it in the fact that the works of our best painters are almost always shown either in connection with first-rate pictures of the French school, among which their identity is to a certain extent lost, or as solitary gems in a mass of auction-room trash. Many an American tourist in Paris has observed with satisfaction the interest which one of Mr. Weeks's, or Mr. Gay's, or Mr. Pearce's pictures excites at the *Salon* in the most cultivated public in the world, and a half-hundred of really great American works would be a revelation, and an inspiration, to the art-students of this country. It would be said, of course, that artists of French training would have an unjust preference; but if artists of French training paint the best pictures, they ought to be preferred; and, in point of fact, La Farge owes nothing to French training, and Picknell very little, and the French themselves have been the first to accord these two men places in the very front rank among the landscape-painters of all countries.

WE hope that some of our readers, who may happen to be in Boston, will take the trouble to study the spire of the Park-Street Church from the window of some office in the upper stories of the new Tremont Building. From these offices the spire is seen almost in elevation, and it is extremely instructive to note the way in which the pilasters of the upper stories are inclined backward, and to observe the part which this inclination has in the general effect of the spire and tower. By using the edge of the window-opening as a plumb-line, it will be seen that the corners of the lower story of the spire,

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together with the pilasters carrying the pediments on its four faces, are vertical, or nearly so; but the lines of the two stories above, and of the short attic just under the pyramid, all lean inward. The angle with the vertical is nearly the same in all the stories, and, roughly speaking, the horizontal deviation amounts, apparently, to about one-fifteenth the height of the line. It is curious that the surfaces of the friezes follow very evidently the same inclination as the pilasters. According to Vitruvius, the ancients were accustomed, where the columns of a peristyle leaned inward, to give the frieze of the entablature an inclination outward, to prevent it from being in appearance cut off by the projection of the architrave mouldings; but the designer of the Park-Street Church probably felt that the delicacy of the outline would be interfered with by such a change. However that may be, he succeeded in producing a beautiful spire, which well repays close study. As the old Renaissance church towers of this country and England are usually shown in drawings with vertical outlines, it would be interesting to know how many of them are really built with inclined lines, and how far they owe their remarkable beauty to this circumstance; and a party of conscientious students, armed with a transit, might easily collect information on this point, which would be extremely valuable to themselves and the profession. Although Park-Street Church is not very old, it was designed in accordance with the principles of what we call the Colonial Renaissance, and every architect will admit that those principles, as exemplified in the best works in the style, deserve deeper study than they have yet received.

THE *Revue Industrielle* tells an interesting story of the ingenuity of some workmen in the Krupp works at Essen. In order to make a place for the passage of some pipes, it was necessary to drill holes in the web of a steel plate girder, already set in place. Every one who understands building-operations knows that this is a long and tiresome undertaking, and the men, after drilling awhile, set their heads at work to save their hands, as has been the habit of intelligent human beings since the creation. This time, the workmen, who were familiar with the characteristics of modern military arms, bethought themselves of the enormous penetrative power of the jacketed bullets now used with the modern military rifles. It is well known to ordinary readers that these jacketed bullets, which are covered with a strong and hard casing, to prevent them from flattening out, or "mushrooming," when they strike any object, will go completely through a file of five men, or will penetrate the trunk of a tree three feet thick, with force enough to kill a man behind the tree; and the Essen workmen thought that perhaps a bullet which could go through three feet of green wood might penetrate a thin steel plate. They resolved to try the experiment; and, procuring a naval rifle, which carries steel-jacketed bullets, and is designed for penetrating the light plates of torpedo-boats, they loaded it carefully, took aim at the spots where the drill-holes were intended to be, and fired. The effect was all that they anticipated. Every bullet pierced a hole in the web of the girder, as round and smooth as could have been made with a punching-machine, and nothing more was required to complete the job but a few minutes' work with the reamer. Although the indiscriminate firing of steel-cased bullets, from rifles with a range of three miles, is not a thing to be encouraged, it is quite possible that this quick and ready mode of perforating plates, which cannot be brought to the punching-machine, may prove useful.

THE periodical discussion about the surreptitious gains which architects and engineers make by taking commissions, or, in other words, bribes, from contractors, is going on just now in England. As usual, some one writes to the daily papers, to say that all architects and engineers earn a large part of their income in this way, and all the people who envy them the opportunities which the practice of their profession affords for filling their pockets secretly at some one else's expense think that the story must be true. Of course, there may be some persons who practise thieving under the pretence of being architects or engineers, just as there are lawyers who rob their clients, or help them to rob other people, but it ought not to be necessary to say that to the great mass of the two professions such conduct is totally unknown. Both architects and engineers undoubtedly find in the importance of the interests confided to them an incentive to scrupulous integrity. A man is much more likely to be careless, with the carelessness which is too apt to develop into dishonesty, in regard to small ums, than in the handling of large amounts, and the very facility with which an architect or engineer, disposed to abuse his trust, could filch larger sums with impunity, although it makes the mouths of people water who have no such opportunities, probably makes him more strict in his fidelity to his duty.

SO far as the facts are concerned, authenticated instances of the acceptance of illicit commissions, or the misappropriation of funds in any other way, by architects or engineers, are, we need hardly say, extremely rare. Disappointed contractors are very fond of attributing acts of this sort to professional men against whom they have a grudge; but their stories, when sifted down, usually leave no residue. In reply to a letter to the London *Times*, by some one styling himself a "Civil Engineer," and asserting that contractors frequently pay commissions to engineers, Mr. A. M. Rendel, for twenty-five years the engineer to the India Office, who in the last forty years has, as engineer to various corporations, been responsible, as he says, for the carrying out of contracts to the amount of at least three hundred million dollars, writes that in the whole course of his professional life he has only three times been offered a commission by contractors, and in only one case were the contractors English. He goes on to call attention, in a most convincing manner, to the inherent improbability of such an account of engineering practice as that given by "Civil Engineer." "An engineer," he says, "who has taken a commission from a contractor can at any moment be exposed and ruined by him. Do you suppose that a material percentage of the engineers of this country,— that any one who counts, — is in this position?" This is very well put, and it applies to architects quite as much as to engineers. What the nameless beings who condescend to wallow in the mire of certain kinds of public building work may do, we would not undertake to say; but the men who earn their living by designing and carrying out buildings, not by bribing janitors, or getting political "pulls" on Boards of Trustees, are no more likely to sacrifice the interests of their employer for the sake of pocketing a few dollars than a member of the Bar Association would be to "sell out" a client to the opposing party.

THE Government Printing-office has issued in pamphlet form an extract from the Section on the Mineral Resources of the United States, from the Annual Report of the Geological Survey. This pamphlet, prepared by Mr. William C. Day, relates to the stone industry of the United States in 1895, and is of the highest interest and value. The stone industry, like all others in the United States, declined in 1894-1895, but the relative position of the various States does not seem to have changed materially in this respect, except that certain of the Southern States are gradually coming into prominence as extensive producers of stone, and that the sorts of stone quarried have been modified of late years. An instance of this is to be found in Alabama, which furnished in 1895 more than a quarter of a million dollars' worth of stone, mostly limestone, although some sandstone is quarried there. In a similar way, Connecticut, which once divided the sandstone trade with New Jersey, produced last year very little more sandstone than Massachusetts; while New Jersey furnished only one-third as much as Connecticut, and but little more than Kansas or Michigan; and Pennsylvania, which, a few years ago, was unknown as a producer of sandstone, supplied in 1895 about as much of it as Connecticut and New Jersey together, and more than any other State except Ohio. In the production of granite, Massachusetts keeps the first place, with Maine not far off; while Vermont is rapidly overtaking Maine, and Rhode Island keeps up the output from its splendid quarries in and about Westerly to nearly a million dollars' worth a year; and New Hampshire comes fifth on the list, with about half as much. In marble, Vermont, as usual, leads all the other States, its output being about double that of Georgia, which is second in importance. Tennessee comes third with about a thousand dollars' worth a day; and New York fourth, with two-thirds as much; and Maryland, California, Iowa and Massachusetts are producing a little marble. Limestone is quarried in nearly all the States, Pennsylvania producing the most, about three million dollars' worth, while Illinois and Indiana each furnish about half as much. Pennsylvania also produces nearly twice as much slate as all the other States put together, Vermont coming next, and Maine far in the rear, her output being just about one-twelfth that of Pennsylvania.

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THIRTIETH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE more than ordinarily meagre attendance at the Thirtieth Annual Convention of the American Institute of Architects, at Nashville, last week, calls attention once more, and in a very marked manner, to the illogical and unscientific manner in which this body attempts to carry out the trust it has assumed to take under its charge. That the interests of an important profession and of the fairly large number of men who belong to it should be put, even for a twelvemonth, largely at the discretion of a body of men — of which the fewness is not to be predetermined — drawn together absolutely by chance, is possibly democratic, but it is extraordinarily silly. At any moment the architects of the country may find their interests absolutely in the hands of a small group of convention rounders — men to whom the annual convention, with its opportunity for posing and speech-making, is the great event of the year. We do not say that such men now exist in the profession, but they do exist in other walks of life, and, sooner or later, under the present construction and constitution of the Institute, they may find both a being and an opportunity to do great mischief.

It is puerile in the extreme that the guidance and control — even though limited and not wholly acknowledged by the majority of architects in the country — of professional matters should in any degree be subjected to the chance whims of a primary caucus.

The simple and equitable cure for this really somewhat dangerous condition of affairs lies in vesting the law-making power in delegates appointed by and receiving their instructions from the several Chapters. In this way the attendance of representatives from every Chapter would be secured at every annual convention, whereas now it is not uncommon to have some Chapters wholly unrepresented. It would not preclude the attendance at conventions of non-delegate members, nor debar them from expressing their opinions or using their eloquence in the attempt to influence the action of the voting delegates. On the contrary, it would tend to increase interest in and enlarge the attendance at conventions, since it would give proof that whatever action should be taken would be in the interest of the profession as a whole and not carried out by a small interested portion or clique who had arranged to attend a given annual meeting and "put through" some measure which was of local value and interest for some, while it was equally disadvantageous for others. It would assure, too, a more considerate discussion of the measures brought forward, and would, we believe, prevent the adoption — without intelligent discussion and by a meeting temporarily decimated — of such a measure as the schedule of charges with its fanciful reference to a square root that was adopted at the Convention in New York.

Another practice of the Institute's, it seems to us, should be changed — and the experience at Nashville points this moral, too.

If the Institute is unwilling to abandon annual in favor of biennial or triennial conventions, it seems to us that it is about time that it ceased to be a peripatetic body. Its past and present practice of holding its annual meetings now in this city, then in that, has a specious appearance of fair play, and as one of the reasons for the practice — the fact that it gives architects an opportunity and a reason for visiting different cities — will always hold good, it is a practice that it would be unwise to abandon wholly; but it would be wise to modify it to such an extent that the alternate annual conventions should always be held in the same city, while the miscellaneous wanderings, with their uncertainties of cost and attendance, should come about only half as often as now. There are many reasons why Washington should be selected as the place for the regular biennial attendance we suggest, and as the Nashville Convention has expressed itself in favor of building — some time or another — at Washington a permanent home for the Institute, there could be no better way of bringing this about and no better way of helping to effect those changes in the designing of Government buildings which the Institute is working to bring about, than to now adopt Washington as the place for regularly holding the annual convention on alternate years. Some of the reasons why Washington should become the permanent home of the Institute were presented by a communication formally presented by the Washington Chapter.

As to the efforts the Institute has made to effect a change in the designing of Government buildings, Mr. Post, Chairman of the Legislative Committee on Government Architecture, called on Mr. Carrère to read the report. This report gave a history of the effort to secure the passage of a bill to change the present method of securing designs and awarding contracts for the construction of Government buildings. A bill is now ready for passage in both Houses of Congress, changing the entire system by opening the competition to all architects of a certain age and experience.

Mr. Post spoke of the effort to improve Government architecture and to make the construction of public buildings a reward of merit. He said that the desired legislation was sure to come in this Congress or the next, if the proper exertion should be made to secure a hearing in both Houses of Congress.

Mr. Carrère also spoke to the report. The bill was in many ways imperfect, but it accomplished the purpose of employing the best talent this country could produce to design the public buildings of the country. He moved the appointment of a committee to formulate a circular or address to every member of the Institute, urging their influence with the press and with Congressmen for the passage of the bill.

Mr. Post said that he was informed that the passage of the bill would be followed by a bill creating a Department of Architecture. No one man could do the work devolving on the Supervising Architect of the Treasury, and do it well.

Mr. O'Rourke, formerly Supervising Architect of the Treasury, spoke of the need of diplomacy in not antagonizing influences in Washington. The Supervising Architect's office gave the Secretary of the Treasury three or four hundred appointments. The only time to move for the creation of a Bureau of Architecture was at the beginning of a new administration, before the Secretary of the Treasury was settled in his place.

In pursuance of the same theme, Mr. Aiken, Supervising Architect of the Treasury Department, read a paper on "National Architecture."

ANNUAL ADDRESS OF THE PRESIDENT OF THE A. I. A.

IN calling to order this the Thirtieth Convention of the American Institute of Architects, I am profoundly impressed by the phenomenal development of the art of architecture in our land as shown by the history of the Institute itself.

In the year 1857 a few architects, some of them, fortunately, men of great force of character, brilliant ability and profound devotion to art, held a series of meetings in the City of New York and effected the first practical organization of this association.

The architects of the country were then few in number, almost all of foreign birth and education, and concentrated in three or four of our principal cities.

They neither had a status in the community as men of business or science, far less as artists; it seems to have been the popular opinion that their sole claim to merit was what was supposed to be an intuitive perception of the beautiful, which was characterized as "taste," combined with a certain facility in drawing, and the sole necessary preparation for practise of their art, the possession of a copy of Vignola, and a few engravings of houses, parish churches and cathedrals. In fact, they appear to have been considered in America as a useless and expensive luxury.

How marvellous the change! Four hundred and sixty architects are now Fellows of the Institute — they are spread north and south, east and west throughout the land, and students and architects trained in the best schools of Europe and America who have not yet reached the dignity of Fellows of the Institute are numbered by the thousands.

Throughout the greater part of the country the architect is the accepted arbiter in all matters connected with the building art.

He is recognized as the acute man of business, without whose aid no structure, from the laborer's cottage to the palace of the merchant prince, from the wooden chapel to the stately cathedral, can be judiciously or economically constructed.

He is respected as the man of science, whose ingenuity and trained skill in construction is furnishing models for the imitation of the world.

Last, slowly and grudgingly has come his appreciation as an artist, and the recognition of architecture as the most enduring, exacting and comprehensive of the fine arts.

The influence on painting and sculpture has been great. I may state without fear of contradiction that not only does the architect furnish to the painter and sculptor now, as always, his noblest opportunities (and the benefit is mutual, for without the aid of the painter and sculptor no complete work of architecture is possible), but that hardly a movement for the advancement of art in any of its branches is successfully made throughout the land in which the architects of this Institute are not the moving spirits.

Thus, in little more than one generation a glorious art has been born in the land and has reached a vigorous manhood.

Never before in the history of the world has there been the opportunity offered by our times and in this great and growing country for the rapid and successful development of architectural art.

Our profession imbued with the vigorous enthusiasm of youth in arts; less trammelled than in older countries by the exacting control of long-established conventional methods of design, but fully appreciating the absolute necessity of a training in such conventional methods; stimulated by the demands of a people as liberal in their expenditures as they are practical in their requirements; the successes and failures of the past and present clearly indicated by a cheap, voluminous and comprehensive literature; the methods and teachings of the great foreign schools constantly before us for guidance and instruction, the schools themselves open to our students; the examples of the Old World brought daily nearer by increased facilities for economic travel; a thorough knowledge of its art treasures within the reach of all through the inexpensive photograph; encouraged by the achievements of the past, are not we justified in the hope that the next generation will see American architecture advance toward perfection with strides unprecedented in the history of art?

A phenominally rapid growth must be always fraught with danger and this Institute should remember that, as the guardian of our art, it is under grave responsibility.

By precept and example its members should ever guide the student; should heartily support our schools, which are numerous and excellent; and should demand that without undue sacrifice of practical instruction they should be, first and foremost, artistic in their teaching.

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They should be insistent in their assertion of professional dignity should direct and control each forward movement, and if anything should seem to menace the healthy development of our art, they should be prompt to sound a note of warning.

They should never forget that the principles of their art are as controlling and immutable as the law of gravitation; that that which was great in design and construction in the days of the Ptolomies or Cæsars, at the time of the mediæval cathedral or of the Renaissance, now is and always will be great, and that it is not great because it was designed in exact conformity with current fashion or professional dogma, but because it conformed to the inherent principles of art.

In the facility for construction offered by modern engineering and cheap steel, I see a most formidable menace to the rapid and healthy progress of American architecture.

Let us ever remember that no body can be beautiful if its skeleton be ill-proportioned: that to achieve artistic success the exterior and interior, both in motif and design, must conform to and be the result of the exigencies of the plan. No sham can stand the crucial test, the criticism of coming ages.

It has been the proud boast of the architect that his work formed the almost imperishable record of the civilization and art of his age and generation. Let us so build that our important works will stand for ages.

Steel should be our most profitable and efficient servant, if legitimately used, to secure stability and strength, but if used as a means of deceptive construction, all art in the work must die, for the fundamental principle of art is truth.

In this connection the papers to be read before us, upon "The Influence of Steel and Plate-glass in the Development of a Style of Architecture," will be heard with interest, and incidentally I believe that the hearing of papers and discussions which they elicit may with profit in the future occupy relatively a larger part of the time of the Institute when in Convention, and that debates on the Constitution and By-laws may be made more brief.

I am happy to be able to state that the persistent and reasonable demand of the profession, that the buildings hereafter to be erected by the Federal Government should be, at least, as good in design and as economic in construction as the work done by the architects in private practice for States, corporations and individuals, is likely to receive its reward in the near future in the passage of a measure which will result in proper competition for such work, rather than requiring, as now, that the designs should be made in the Treasury Department under conditions which render good, artistic and economic work a physical impossibility. The report of the Committee on the United States Federal Buildings is of the utmost importance.

My predecessor in office last year directed your attention to the need of a permanent home for the Institute. The matter is one seriously affecting our possibilities for exerting the most useful influence. The subject of this report is worthy of most careful and mature consideration.

During the past year we have been called upon to mourn the loss of five Fellows: Joseph Lederle, of New York; A. M. F. Colton and W. J. Edbrook, of Chicago; A. P. Cutting, of Worcester; A. Page Brown, of San Francisco. And three Honorary Members: The Rev. W. H. Furness, of Philadelphia; Martin Brimmer, of Boston; and the Chevalier J. Da Silva, of Portugal. Also one Corresponding Member: G. Brown Goode, of the Smithsonian Institute.

By the Order of Proceedings of the Convention, the address of the President forms the first subject of debate.

He has preferred to make but slight reference to matters of its material interests, knowing that they would be fully and ably treated in the reports of your officers and of standing committees.

He has preferred rather to tax your patience by a review of the state of the art of architecture in America, and its present possibilities of development, and to ask in view of their achievements in the past, and the promise of the future, if the architects of this Institute are not justified in the hope that, if true to themselves and true to their art, the time may come when the world may look to this country for its great examples of modern architecture, when the American School of Art will be the first and greatest in the world?

REPORT OF THE BOARD OF DIRECTORS OF THE A. I. A.

NOTWITHSTANDING the depressed condition of business in the country, the affairs of the Institute have enlisted the uniform and sustained interest of the Fellows, and the correspondence of the Secretary with the Fellows of the Institute has never been greater than during the past year.

The membership has increased by the election of Leopold Eidlitz, of New York and George Keller, of Hartford, by the Board of Directors, in accordance with the power given it by an amendment to the By-laws passed at the St. Louis Convention, and by the election by letter-ballot of fifteen Fellows.

Mr. Dankmar Adler's return to the practice of his profession has also restored him to full Fellowship with the Institute, making a total addition of eighteen Fellows.

The loss by death has been five, and by dropping from the rolls, thirty-three, leaving a total membership of four hundred and sixty-one (461) Fellows. The statement of the loss by dropping from the list of Fellows of the Institute thirty-three names would be misleading, if it were not explained that some have been carried on the rolls for a long time with the hope that many, if not most of them, might find themselves able to continue with the Institute: some have given up the practice of architecture, and some have moved from their former residences to places unknown to the officers of the Institute, making it necessary for the Board of Directors to formally recognize the existing condition and vote to drop the names from the rolls.

The death of Mr. Joseph Lederle, of New York, occurred on March 21, 1895, but was not known to the Secretary until too late to report to the St. Louis Convention.

The death of A. M. F. Colton, of Chicago, occurred March 13, 1896, at the age of seventy-one.

Mr. A. P. Cutting, of Worcester, Mass., a former member of the Western Association, died February 6, 1896, in Los Angeles, Cal., where he had gone in search of renewed health.

Mr. A. Page Brown died at San Francisco, January 21, 1896, as the result of an accident which happened to him several months before. Although among the younger men of the profession, he left behind him many evidences of his professional skill and taste, especially in works produced in the characteristic style of the Spanish architecture, which had grown up in the Spanish and Mexican colonies on the Pacific coast.

W. J. Edbrooke died in Chicago, March 25, 1896. He was Supervising Architect of the U. S. Treasury Department during the administration of President Harrison and won many friends during his residence in Washington.

Of the deceased Honorary Members, Rev. W. H. Furness, D.D., the distinguished Unitarian divine of Philadelphia, where he had resided during the whole of a long and most memorable pastorate was a lover of the fine arts and of architecture, and those who attended the Annual Convention held in Philadelphia, in 1871, will remember with pleasure the address he delivered before the Convention on that occasion. He was the father of Mr. Frank Furness, the well-known and distinguished architect of Philadelphia.

Mr. Martin Brimmer, of Boston, a discriminating patron of art and liberal contributor of both money and time to its promotion, was also an author of recognized ability and broad culture. His writings upon Egypt have been recognized as authority on this subject, and are noted for beauty of diction and graphic description.

Chevalier Da Silva, Court Architect of Portugal, for nearly thirty years an Honorary Member of the Institute, died on March 24, 1896, at the age of 89, full of years and honors, distinguished at home and abroad as an architect and archæologist.

Of the Corresponding Members, the Institute loses Prof. G. Brown Goode, the well-known Assistant Secretary of the Smithsonian Institution and Curator of the National Museum, who brought out of a chaos of inaccessible treasures the orderly, well-arranged, enjoyable and instructive collection which makes the Smithsonian Institution take rank with the finest museums in the world.

Your Directors have considered the various questions which have been brought to their attention, and have endeavored to promote the best good of the Institute and to assist in every movement to elevate the tone of the profession.

The question of establishing permanent headquarters for the Institute was referred to a Committee, which will present a partial report to the Convention for your consideration.

The Committee appointed to consider the questions in connection with designing buildings for the U. S. Government will also present a report of its doings, which will show that much progress has been made, and with the hearty coöperation of Mr. William Martin Aiken, a Fellow of the Institute and the present incumbent of the office of Supervising Architect, it is confidently expected that the movement will result in legislation tending to place the whole matter on a more satisfactory basis than it has been since the creation of the office.

The publication of Professor Johnson's papers on "Timber Tests and Flitched Beams" has been received with much interest, and your Secretary has had requests for the same and for the reports of the tests of the United States Government from the most distant quarters, the latest being from South Africa, where the subject engaged the attention of a meeting of the South African Architectural and Engineering Association, Mr. Johnson's and Mr. Bullard's papers giving occasion for the discussion, and forming the basis of the evening's debate.

The proposed destruction of the Bulfinch portion of the Massachusetts State-house did not formally come before the Board for consideration, but the officers of the Institute, as individuals, gave expression to their opposition to the proposal, and it is believed not without effect—at any rate, the destruction of the building has been, it is hoped, permanently averted.

The want of uniformity in the rules for installing electrical work has been a fertile field for discussion and censure in the architectural profession, and the President readily embraced the opportunity offered to send your Secretary as a delegate to a Conference held in New York last spring on "Standard Electric Rules," and the Board of Directors voted that the Treasurer of the Institute should pay $25 towards the expenses of printing, etc. Your Secretary was appointed a member of a Committee of the Conference, for the proper formulating of rules to be submitted to the Conference. This sub-committee met in New York on Friday and Saturday of last week and made good progress, will hold another meeting in November, and hope to report the result of their deliberations to the Conference in December. There is little doubt that, as a result of the Conference, more uniform and consistent rules will be adopted

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and promulgated, and the Institute will probably be asked to endorse and recommend them.

It is therefore desired that the Institute consider at this meeting whether it wishes to give the Board of Directors authority so to do, in case the rules meet with their approbation, and that the endorsement asked for properly comes within the province of the Insti-tute.

The question of licensing architects has not been as actively agitated the past year as it was the year before, and from the criticisms which have been made upon the passage of laws which compel the examination of architects and licensing such as prove competent, it would seem to be worth while for the Institute to consider whether it had not better itself institute a system of examinations before admitting members to the Institute, as is done in the case of the Royal Institute of British Architects and of the Manchester Society of Architects.

It is evident that the present relation of the Chapters to the Institute is not as close as it was when all the professional members of all the Chapters were members of the Institute, either as Fellows, when raised to that position by election, or as Associates by virtue of their Chapter membership. Not a few of the older Fellows question whether the Institute did not make a mistake in giving up the title and class of members formerly designated "Associate Members," and thus retain that relation between Chapters and the Institute which has been justly considered essential for the best interests of both. If we were to go back to the old method, it is believed that new Chapters would be formed, the membership of the Institute would at once be increased, and its influence widely extended.

The work of local Chapters has been in many cases very effective, in assisting in the construction of building-laws, and urging and aiding their passage; in advising and educating municipal Governments, committees and individuals as to the conduct of competitions; in promoting and advising municipal improvements; in inaugurating and conducting or assisting in public architectural exhibitions, and in many other ways making themselves helpful factors in modern life.

The Royal Institute of British Architects has, like the A. I. A., lately adopted a form of Uniform Contract, which, as is the case with that adopted by the Institute, has been subject to a good deal of adverse criticism, but, notwithstanding, has been largely adopted and used. There will be many architects who will not use any form of contract except one of their own, and many architects prefer to have their clients employ counsel to draw up the contracts, especially when they involve the expenditure of hundreds of thousands of dollars, but it seems not only reasonable but of great advantage in ordinary contracts involving an expenditure of not more than $50,000, that the Uniform Contract should be used, for by such use it comes to obtain a force which is of great value; the interest of both owner and contractor are established on a just basis; and its provisions for arbitration do much to prevent expensive litigation, and avert the danger of unfair treatment of the contractor by owner or architect, and give both owner and architect ample opportunity to compel a contractor to faithfully fulfil his contract. It is therefore hoped that the continued use of the Uniform Contract will increase, and that persons wishing changes made therein would send the same to the Secretary for consideration.

The attempt to alter the Constitution by reducing the number of members of the Board of Directors and by permitting a change in the same upon an affirmative vote of two-thirds of ballots cast, instead of two-thirds of all the Fellows of the Institute, was defeated, because less than two-thirds of the Fellows voted for the changes proposed, 277 voting in the affirmative to 30 in the negative on the first proposition, and 376 voting in the affirmative and 22 in the negative on the second, showing a preference not to concentrate the power to rule in the hands of a small governing Board.

Mr. Daniel C. French has been commissioned to erect a memorial to the late Richard M. Hunt, a former President of the Institute, on the wall on the Fifth Avenue side of Central Park, at one of the entrances near the Metropolitan Museum. The Directors would suggest that the Institute testify to its love and respect for the memory of Mr. Hunt by a subscription of $1.00 from each and every Fellow.

It is the purpose of the Board to issue the *Proceedings* of the Convention by the end of the official year, and the Secretary has been instructed to print in it a chronological list of all the members of the Institute from its beginning, and to print by themselves the names of the "Founders of the Institute," and thus perpetuate the memory of those who, impelled by a love of architecture as a fine art, established it in order to elevate the practice of architecture and to encourage a standard of professional and ethical conduct.

Since the foundation of the Institute, the number of persons who have entered the profession has increased in a ratio far beyond the increase of the population of the country, and a corresponding demand for the services of architects has grown with the growth of practitioners, but the hustle and strife to secure clients has not grown less, but has increased, and the resort to unprofessional methods, which a fine instinct rebels against, has become so much a matter of course that a hesitation to enter the scramble is supposed to indicate a want of energy and enterprise by those whose professional services are set up for sale — as the manufacturer sets up his goods to be drummed for and "promoted." It is essentially the duty of the Institute to foster and maintain in the practice of its Fellows the highest standards and to discourage everything tending to lower it, and also to encourage the growth of an instinct which is too sensitive to be defined by a code of ethics, and which settles all questions by asking how it would seem if the proposed action towards another was the acting of the other towards himself.

The committee on the Report of the Board of Directors made their report at the closing session of the Convention in the form of a series of resolutions, which report was as follows:

"*Resolved*, That the permanent headquarters of the American Institute of Architects be located in the City of Washington at as early a date as is possible, and that the Executive Committee be empowered to make such arrangements as are necessary.

"*Resolved*, That the Institute continue to be represented in the conference having in charge the establishment of standard electric rules.

"*Resolved*, That a committee of three be appointed by the President to obtain expressions of opinion from the Chapters as to the advisability of the licensing of architects by State legislation and the relation which the examination for such license should sustain to that required for examination for admission to membership in the Institute; and further, if they deem it expedient, that the election of Fellows be made more dependent upon professional skill and practice than at present. This report to be made at the next convention.

"*Resolved*, That the Directory is hereby authorized to issue a circular to each member of the Institute, requesting a subscription of $2 from each member as a contribution from the Institute to the fund for the memorial which is to be erected in memory of its late President, Richard Morris Hunt, from the designs of Daniel C. French, and that it is the sense of the Institute that the contribution of the Institute be, at least, the sum of $500.

"*Resolved*, That all matters mentioned in the report of the Board of Directors relating to the amendments to the Constitution and By-laws, and the relation of the Chapters to the Institute be referred to the special committee appointed to consider the revision of said Constitution and By-laws.

"We recommend that Mr. Andrews's resolution be presented to the Convention for action, and that it be amended as follows: That the Secretary be empowered and requested to make a collection of the building-laws of all the more important cities of the world, and report progress at the next convention, with the view of carrying out the suggestions contained in the report of the Committee on Building-laws."

The resolution regarding the erection of the monument to the late Mr. Hunt was favorably discussed by several members. The President stated the purpose of the monument. Mr. O'Rourke thought a little drawing of the proposed design would be beneficial to the subscriptions. The President stated that he was sure Mr. Hunt's family would prefer a simple monument erected by small subscriptions from a thousand artists, to a more elaborate memorial erected by large contributions from half-a-dozen of Mr. Hunt's clients.

The following resolution was also adopted:

"*Resolved*, That the American Institute of Architects, mindful of the enormous waste of valuable material because of ignorance of the value in strength of American timber, and appreciating the value of the elaborate tests of timber which have been made by the Forestry Division of the Department of Agriculture, sees with regret that the work has been entirely discontinued on account of deficient appropriations, and therefore takes this occasion to express its approval of Senate Bill No. 1214, introduced by Mr. Squire, of Washington, making an appropriation for the continuance of the work under the direction of the Forestry Division of the Department of Agriculture."

THE annual election resulted as follows:

President, George B. Post, New York; *First Vice-President*, Wm. G. Preston, Boston; *Second Vice President*, James S. Rogers, Detroit; *Secretary*, Alfred Stone, Providence; *Treasurer*, Samuel A. Treat, Chicago; *Directors* — William C. Smith, Nashville; Levi T. Scofield, Cleveland; John M. Carrère, New York; W. M. Poindexter, Washington; James B. Cook, Memphis; George B. Ferry, Milwaukee; Henry Van Brunt, Kansas City; John M. Donaldson, Detroit.

The following were elected Honorary Members of the Institute: Gen. Francis A. Walker, Boston, President Massachusetts Institute of Technology: Sir Francis C. Penrose, F. R. S., London, Eng., President Royal Institute British Architects; Alfred Waterhouse, R. A., LL. D., London, Eng., ex-President of the R. I. B. A.

The following were elected Corresponding Members of the Institute; Tatsuno Sone, architect, Tokio, Japan; Dr. William Dörpfeld, F. S. A., Athens, German Archæological Institute; Edward Robinson, Boston, Mass., Curator of Museum of Fine Arts; Daniel C. French, sculptor, New York; Gen. Luigi P. di Cesnola, New York, Curator Metropolitan Museum; Philip R. Uhler, Baltimore, Md., Provost Peabody Institute.

THE INFLUENCE OF STEEL CONSTRUCTION AND PLATE-GLASS UPON STYLE: A PAPER BY MR. DANKMAR ADLER.

THE author of an article recently published in *Lippincott's Magazine* summarizes the laws of architectural design in the sentence "form follows function," and endeavors to condense into three words what others have vainly tried to enunciate in numerous treatises and in bulky volumes on the Philosophy of Art. If it was

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necessary to state in a three-worded aphorism the entire law of architectural design and composition, nothing could have better suited the purpose than the words quoted above from the pen of that clear thinker and brilliant writer, Louis H. Sullivan.

Every architectural work has a "function," a purpose which has called it into being, and its success is measured by the degree of approximation to fulfilment of "function" which characterizes its "form."

From this one might infer that it is only necessary to divide into a few classes the functions to be served by architectural structures and to determine the form best adapted to each, and thus develop an infallibly correct system of architectural design from which none may deviate without incurring the reproach of ignorance and lack of culture.

We should then have an architecture somewhat more scientific and vastly more practical, but as trite and as devoid of the interest imparted by the creative impulse as is the architecture founded upon the principle, *form follows historic precedent*, which stamps as barbaric every structure for which the architect has failed to provide an academically and historically correct mask and costume, and which treats as heresy an attempt to do, not as the Romans did in the year 1, but to do as one thinks the Romans might have done in the year 1896.

Returning to Mr. Sullivan's aphorism, we find that he bases it upon studies and conversations of nature which, carried a little farther, show that although the common function of all organic creation is maintenance and propagation of the various species, yet an ever varying environment has produced an infinite number of species and innumerable differences in individuals of each species.

Therefore, if "form follows function," it does not follow in a straight line, nor in accordance with a simple mathematical formula, but along the lines of curves whose elements are always changing and never alike.

If the lines of development and growth of vegetable and animal organisms are infinitely differentiated, the processes of untrammelled human thought and human emotions are even more subtile in the differences and shadings of their manifestations, while the natural variations in conditions of human environment are as great as those which influence the developments of form in the lower organisms; and human work is further modified by necessary artificial conditions and circumstances.

Therefore, before accepting Mr. Sullivan's statement of the underlying law upon which all good architectural design and all true architectural style is founded, it may be well to amend it, and say: "function and environment determine form," using the words environment and form in their broadest sense.

The functions served by the work of the architect have expanded but little, and have varied still less within the limits of the historic records of architecture, nor has there been much change until the last quarter of this century in those conditions of environment which comprise the structural and decorative materials at the disposal of the architect.

The great epochs in the development of architectural style are respectively characterized by the introduction of the pointed arch and its characteristic vaultings. It is our good fortune to have inherited all that was accomplished by the many generations who lived and thought and worked in those epochs. We are still more blessed in being allowed the privilege of participating in the creation and in witnessing the birth of another epoch in architectural design, the form or style of which will be founded upon the discovery of the steel pillar, the steel beam, the clear sheet of plate-glass, electric-light and mechanical ventilation, all devoted to the service of functions or wants created by the greater intensity of modern life and by improved means of communication between places and men.

Probably there were those in Greece who deplored the departure from correct and historic Assyrian and Egyptian architecture, which had to be made in order to originate and establish the most exquisitely finished and most fully and logically developed architectural style the world has known. And when the sturdy but gross-minded Roman used and modified Greek prototypes in accordance with his coarser and more aggressive mentality, and when, finally, he introduced the arch and the vault, and substituted for the refined and elegant treatment of the severe and regular forms inseparable from beam and lintel construction, a bold and comparatively unrefined treatment of the more irregular and picturesque forms made possible by the discovery of the arch, the new departure was certainly as displeasing and distressing to the purists and scholars of that day, as were in later days the works of those alleged barbarians whose efforts to utilize to the utmost the means and knowledge at their command, created the styles known as "Byzantine" and "Romanesque," and finally that culmination of protest against dry-as-dust tradition, the styles which scholars and men of culture derisively named after the barbarian Goths.

So, also, in our day, many of those who have been taught to understand and love and honor forms and traditions transmitted from past ages shrink from contact with the new materials and processes, and, noting the inevitable modifications of time-honored theory and practice, lift their voices in protest against legitimizing forms which are the offspring of newly-arisen functions and of newly-discovered conditions of environment.

And yet each historic style was called into being in obedience to new developments of function or environment, and each was in its day an iconoclastic innovation upon well established and firmly founded practice.

Therefore, we are justified in assuming that the new conditions will exert a marked influence on architectural style in our day and in the future.

It is the duty of those, who by familiarity with the historical styles are best fitted for this task, to ascertain the creative principles and laws which underlie the architectural style of bygone periods of greatest artistic achievement, and to apply these principles to the utilization of the means placed at the disposal of the architect of our day for satisfying the requirements of the day.

The American architect, who travels in Europe and studies the architecture of the many ages which have preceded the last century, is impressed and charmed by the freedom and *naïveté* with which consciousness of the fact that each age is the heir of all preceding ages is proclaimed in the composition and in detail of so many structures. Nothing can be more interesting than the observation of the existence of a living vigorous style, joyous in the consciousness of life, free to assimilate the old and to create the new. Nor is it unprofitable to follow a style from the exuberance of its youthful vigor to old age and decadence, to ossification and crystallization into an inert and lifeless set of fixed and unalterable rules, into a fetich to be worshipped by future generations; in other words, into an academic historic style.

But after one has taken it all in, there is one impression stronger than all others. It is the consciousness of the zeal and earnestness of the all-pervading endeavor to so utilize all the means at command, that the form and expression of each structure might conform to its function, whether that were the worship of God, or the glorification of guild or municipality; whether intended to serve the lavish display of the wealth and dignity of the great noble, or to house the humble burgher, each kind of structure has its individuality, and of these, again, each gives expression to the character and personality of its occupant.

Our generation has in many ways shown itself worthy of its heirship of so many ages, and has given expression to its appreciation of its good fortune by transmitting to the future an inheritance still more valuable than that which has fallen to its lot.

What can the architect do, that he also may prove himself worthy of opportunities so much greater than those enjoyed by his predecessors?

Human nature has limitations which circumscribe and define the attainable in literature and art. There will be none greater than Homer, than Moses, than David, than Shakespeare, than Phidias, than Leonardo da Vinci, than Raphael, than Michael Angelo; no author, no sculptor, no painter, no architect can as an artist expect to excel many who have gone before. But the architect is not only an artist, but also an engineer, a man of science and a man of affairs. In these latter capacities, the architect of to-day has at his command instrumentalities and opportunities unknown to his predecessors. Were he an artist only, the giant strides which science, and by its aid industry, communication and traffic have made in the past fifty years would leave him by the wayside, content as are his fellow-artists of the brush and chisel to admire the onward rush, to be with it, but not of it, to be dazed by its splendor and to thrive and wax fat under the patronage of those who initiate and control the movement of modern material progress.

But architecture is not permitted to remain placidly contemplative of the march of events. The architect is not allowed to wait until, seized by an irresistible impulse from within, he gives the world the fruit of his studies and musings. He is of the world as well as in it. The world of to-day has greater need of his aid than had any previous period, and he is pressed into its service and must work for it and with it, no matter whether or not urged by the spirit within him. The world must have buildings; it will have them adapted to its wants and functions; it will insist upon the utilization of the best of the materials and processes which scientific and industrial progress place at its disposal. The architect must, therefore, fit himself for the duties thrust upon him. The world calls upon him to do the work of to-day with the tools of to-day, not as a tyro, not as one who must first learn how, but as an architect, a master worker, as one of whom the world believes that familiarity which he has acquired with the processes by which the work of other periods has been accomplished makes him better fitted for the work of to-day, and that he will press into its service all the experience of many ages and epochs.

Michael Angelo was painter, sculptor, architect, diplomat, but above all, and in all, an artist. An important factor in his greatness as an architect was his familiarity with the technique of the auxiliary and subsidiary arts, sciences and crafts, the command of which devolves upon the architect. The great Buonarotti did not disdain to learn the metal-founder's, the quarry-worker's and other crafts in order to be the better able to carry out the plans which his great mind had conceived. Were he among us now, he would be in the front rank of the experts and specialists in all the modern arts and sciences which have arisen to perplex and worry the artist-architect wedded to the traditions, processes and materials of the past. And being Master of specialties and details, he would, as General, master them all into martial array for overcoming the difficulties incident to the expanded and diversified demands which our time makes upon the architect.

Few, perhaps none, of us can be equal to Buonarotti, but all can

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emulate him in his zeal and capacity for hard work. We, too, can become impatient and contemptuous of the performance of auxiliaries and specialists, and dismissing them, can ourselves acquire a knowledge of the technique of their arts and sciences and crafts, and in the furnace heat of zeal and enthusiasm for the attainment of a great end, combine all that we honor in the lore and traditions of our profession with the discoveries and achievements of the science of to-day, pour all into the mould of contemporary requirements and bring forth our contribution to the architecture of the New World, the new age of steel, electricity and scientific progress.

For several years it has been the fashion among the professors of our art to decry the new materials and processes of construction and condemn their most noteworthy applications to the service of requirements born of modern conditions. The contributions which modern science has made to our power to command and utilize the materials and forces of nature, and the increased and expanded opportunities for the creation of useful and beautiful works which modern society has given us, have been looked upon askance. And it is greatly to be regretted that some of those whose works had proved them well qualified to determine under the new environment the forms best adapted to the old, as well as the new functions, have been most persistent in their condemnatory utterances against the new problems which they themselves were so successfully solving.

What I have written is intended to be a protest against the dogma that art in architecture ended with the Renaissance, a denial of the assumption that the use of materials and processes, and wants and functions unknown to the masters who flourished in that glorious period, or to their predecessors in other eras of great artistic vigor in architecture, is incompatible with the performance of truly artistic work.

I wish to maintain that the steel pillar and beam, and other contemporary contributions to the materials and processes of building construction, that the modern business building, and many other so-called monstrosities, are as legitimate contributions to architectural art, as were in their day, when first introduced, the stone pier and lintel, the brick wall or pier, the arch, the vault, the roofed temple, the vaulted basilica, the spired and buttressed cathedral. All that is wanting is the will and the ability to make proper use of these newly-discovered agencies.

The new materials and processes, the new requirements should not, however, in their introduction into architecture and in their assimilation by our art, be treated as things apart and by themselves, but they should be treated as related to and part of all that has gone before in the long history of human and artistic progress.

The author of to-day has at his disposal and does not disdain to use an enlarged vocabulary; the musician has a greater range of instruments, a richer and fuller orchestration; and the great composer deems it a privilege to be able to evolve combinations of tone that were unattainable to his predecessors. And even if the painter of to-day uses the same pigments, and depicts the same phases of animate and inanimate nature, and the sculptor uses the same marble, and both painter and sculptor play upon the same gamut of human emotions, as did their prototypes for many generations, that is no reason why the architect should look askance upon new instrumentalities and new opportunities for developing and enlarging the scope of his art.

Let us, then, welcome the prosaic output of furnace and mill, and even the unpromising and garish sheet of plate-glass. If they are always used where they are wanted and as they are wanted and never where they are not wanted, nor as they are not wanted, we shall have taken the first step towards the transmutation of these utterances of scientific prose into the language of poetry and art. In the nature of things, the block of rough stone, the lump of clay, the log of timber, all are apparently as uncompromisingly unpoetic and inartistic as the much-dreaded and imprecated modern intruders into the programme of architectural composition, which form the title of this paper. What they have of poetic suggestion and significance they owe to the genius of man, and what man has done, man can do. Let us not stand back and admit that we are unable to learn from our predecessors how difficulties are overcome, how victory is wrested from apparent defeat.

Yet another word. I have quoted the dictum "form follows function" and have modified it into the words "function and environment determine form."

Steel pillars and steel beams occupy so little space that in order to enclose structures of which they are the essential supporting parts, they must be furnished with a filling, if a space enclosing structure is to be erected, and steel posts and beams to be adequately protected against possible attacks of fire must receive bulky fire-protective coverings. In these fillings and coverings we obtain media for artistic treatment which may be handled solely with reference to the desire to adapt "form" to "function."

From this I deduce that the influence of the new materials and processes will tend to a more free and less trammelled treatment of architectural design, and that the striving for the creation of ideally perfect form will be less hampered by limitations incident to the use of refractory materials of construction.

IN the discussion which followed the reading of the several papers on steel construction and plate-glass, Mr. Carrère said he was particularly impressed with Mr. Yost's suggestion of separating the envelope from the interior construction. If the interior construction could be placed sufficiently within the envelope, it would allow wider scope for ornamentation and treatment. He believed that the tall building of the future would be fireproof, permanent, — if anything could be said to be permanent, sanitary and healthful. Toward this end the architect should strive.

Mr. Hallberg spoke of the unsafe high buildings. When a building 300 feet high was erected of steel framework, the steel in which was half an inch thick, and covered with brick and terra-cotta, was it safe? Brick and terra-cotta were porous. Every drop of rain was absorbed, and it was only a question of time when corrosion would result. He liked the New York style of building a wall heavy enough to support the superstructure, and believed it should be followed in the West.

Mr. Post said that he had built the first steel cage about eighteen years ago, and had a right to criticise. He had been brought up as an engineer, and in following architecture he had always kept his engineering knowledge in mind. He had tested the corrosiveness of wrought-iron and steel, and found structural steel much more subject to corrosion than wrought-iron. This, however, was the age of the steel cage and plate-glass epidemic. He believed in a wall strong enough to support the structure; put the steel pillars within the walls, and thus put it beyond the reach of fire. Why the rage for large plate-glass surfaces existed, he could not understand. Why make the entire side of an office plate-glass, when the first act of the tenant would be to cover up the glass with blue shades? He was not impatient for a new style of architecture, for it could not be created in five years. Our great-grandchildren might in their time evolve a school of architecture.

Mr. O'Rourke regarded steel and iron construction as accessory merely. The true theory was to give it a secondary position — to give rigidity, but not support the outside walls. In his buildings, if every post rotted out, the walls and the building would remain. That was the true idea, he believed.

Mr. Yost said that a brick wall would expand more with fire than either steel or iron, and needed something to hold it up.

Secretary Stone read a letter from Mr. Van Brunt, explaining his absence, and referred to the subject of high buildings. He thought legislation should be directed toward putting high buildings on wide streets. Fronting Central Park, for instance, high buildings might be built on all four sides.

Mr. Post said high buildings were induced by the high price of land.

Mr. Carrère spoke of the possibilities open to cities in making improvements of accumulating a sinking-fund by making the improvements intelligently. By condemning land where it is less valuable and putting improvements on them. The increase in value of the surrounding property would create a sinking-fund that would in time pay for the improvement.

Mr. Stone said high buildings got their light from above other buildings. When they were built too close, they would defeat their very purpose by rendering the lower stories too dark for use.

SOCIETIES

NATIONAL SCULPTURE SOCIETY.

THE National Sculpture Society completed the reorganization attendant upon its becoming an incorporated body, at the meeting of the Council of the Society held at its rooms, No. 39 West 22d Street, New York. The final steps in adoption of a new constitution, necessitated by this change, were taken at the same time.

The election of officers for the new Society resulted as follows: — *President*, Mr. J. Q. A. Ward; *First Vice-President*, Mr. Russell Sturgis; *Second Vice-President*, Mr. Samuel P. Avery; *Secretary*, Mr. Barr Ferree; *Treasurer*, Mr. I. Wyman Drummond. Mr. J. S. Hartley was elected a member of the Council in place of Mr. Olin L. Warner, deceased.

Mr. F. Wellington Ruckstuhl, who was Secretary of the unincorporated National Sculpture Society from its beginning, announced his impending departure for Europe for an extended period, and his resignation from the Council was accepted with regret. The following resolution was moved by Mr. Sturgis and spread upon the minutes of the meeting:

"*Resolved*, That the thanks of the Council of the National Sculpture Society (incorporated) be and they hereby are extended to Mr. F. Wellington Ruckstuhl, the Secretary of the National Sculpture Society (unincorporated), from its organization in May, 1893, until it went out of existence on the organization of the present Society, a period of three years and five months. During this long period Mr. Ruckstuhl has devoted himself to the business and the interests of the Society with entire devotion and self-abandonment, and with thoughtful and watchful care.

"The Council hereby extend to Mr. Ruckstuhl their earnest hope for his prosperity and success during his proposed sojourn in Europe and for his speedy return to take an active part in the affairs of the Society." BARR FERREE, *Secretary*.

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ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

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FIREPLACE IN LADIES' WAITING-ROOM, UNION STATION, ST. LOUIS, MO. MR. T. C. LINK, ARCHITECT, ST. LOUIS, MO.; MR. ROBERT BRINGHURST, SCULPTOR.

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[Additional Illustrations in the International Edition.]

NEW ACADEMY OF FINE ART, DRESDEN, SAXONY. HERR CONSTANTINE LIPSIUS, ARCHITECT.

[Gelatine Print.]

THIS building was erected between 1886–94.

NEW TOWN-HALL, MUNICH, BAVARIA. G. HAUBERRISSER, ARCHITECT.

[Gelatine Print.]

THIS building was erected between 1867–72.

RESTORATION OF THE CATHEDRAL, FÜNFKIRCHEN, HUNGARY. BARON VON SCHMIDT, ARCHITECT.

THIS plate is copied from the *Building News*.

SUGGESTION FOR THE LONDON COUNTY COUNCIL'S HALL, CHARING CROSS, LONDON, ENG., BY MR. H. W. BREWER.

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OLD HOUSE AT MAGDEBURG, PRUSSIA.

THIS illustration is copied from *Zeitschrift für Bauwesen*.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

RESPONSIBILITY FOR SMOKING FIREPLACES.

NEW YORK, October 26, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — If you will publish your opinion in your next issue regarding the following controversy, you will greatly oblige parties interested.

A, as architect, draws plans and superintends the building of a house for B. The mason's specification reads, "fireplaces are to be built with extra large throats gradually contracting to the size of flue, and draught of all fireplaces guaranteed." The flues are shown on plans 8″ x 8″ tile-lined.

B, as builder, completes masonwork in a satisfactory manner, except that at completion of house, fireplaces are found to smoke badly and nothing can be done to remedy the trouble, although the architect and builder spend time and money endeavoring to do so.

Can C hold A or B responsible for the smoky fireplaces, A having endeavored to the best of his ability to make plans and specifications satisfactory, and B having executed the work in a manner satisfactory to A, the work being in accordance with the plans and specifications, except that at completion fireplaces smoke.

A. B. C.

[UNLESS some extraordinary circumstances, such as the neighborhood of a hill, or a high building, either of which will at times cause downdraughts in chimneys which nothing can prevent, have influenced the result, we should say that C was entitled to expect his architect and builder to know enough of the art of constructing fireplaces and flues to be able to make them draw; and that he is, in consequence, entitled to hold them responsible for such damage as he may have suffered from their failure to do so. He may, however, be himself partly at fault. It is a difficult thing to get a fireplace to burn well, unless hard coal or coke is used, with a flue so small as 8″ x 8″, and still more so if the flue is further contracted by a lining; and if C wished the flues to be of these dimensions, he is to a certain extent accountable for the result, even though he may not have known the effect of restricting them within such limits. — EDS. AMERICAN ARCHITECT.]

CAST-IRON *VS.* STEEL COLUMNS.

NEW YORK, October 22, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In the skeleton construction of a twelve-story building, which is best to use, cast-iron, or steel columns? I find a difference of opinion among the authorities, and would like to see in print the arguments *pro* and *con*. I am,

Yours, etc. X.

[As the best method of opening a valuable discussion we publish the foregoing question in the hope that architects in different parts of the country will express their views. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

THE VIADUCT AT MUENGSTEN, PRUSSIA. — The Prussian Government has begun the construction of a railroad viaduct which is to be the loftiest in Europe, eclipsing both in height and in the width of its main arch, the celebrated Douro Bridge at Oporto. The total height of the latter is 204 feet, whereas the viaduct at Muengsten will attain an altitude of nearly 400 feet, while the span of the centre arch will be 500 feet. — *N. Y. Tribune.*

THE SCHOOL AND IRISH FLAG INCIDENT. — Patrick O'Brien, the contractor who was arrested July 4, for displaying the Irish flag from the staging of the Ward 6 School at Lawrence, Mass., then under construction, was given a hearing at the Superior Court, September 30. Charles A. Decourcy, for the defendant, moved to quash, contending that Ireland could not come under the law as laid down in the statute, it not being a free and independent country. The motion prevailed and Mr. O'Brien was discharged. This conclusion leaves unsettled the conundrum: When does a public building become a public building? We question whether the decision will be agreeable to that politically curious class, the Irish-American, since it seems to declare that the Irish flag isn't much of a flag after all. — *Exchange.*

MALARIA BANISHED BY ARTESIAN WELLS. — Our correspondent at Lake City, Williamsburg County, reports that there are now eighteen artesian wells in the village, and adds: "Before the wells were bored the people suffered a great deal with fever and malaria, but now it is a rare thing, indeed, to hear of a case of either." This is very decided testimony to the value of pure water for the redemption of "malarial districts," and Lake City's experience and example should not be lost on other places where the water is bad and health no better. There was a "great deal" of fever in the village when the wells were shallow. Now a case of it is "rare." That is sermon enough for sensible people in other fever-haunted places. — *Charleston (S. C.) News and Courier.*

LIVERPOOL *vs.* MANCHESTER. — The competition of Manchester with the shipping trade of Liverpool has now been felt sufficiently to cause the ship-owners and merchants of the latter city to become alive to the necessity for taking measures of protection. A new business scheme will soon be put to practical test. It is intended to introduce motor cars, each one of which shall be capable of drawing three wagons carrying ten tons of produce. The wagons are to be loaded at the ship's side, and the special advantage will be that goods can be conveyed without transfer to other vehicles directly to the warehouse, wherever it may be situated. The ordinary highways will be utilized for this purpose, without the laying of any rails or other mechanical aids. It is expected that by this means the cost of conveying merchandise to and from Manchester and other towns will be reduced to a point with which the ship canal cannot compete, and the further expectation is that the railway companies will be compelled in self-defence to lower their rates, which again will tell against the ship canal. It is suggested that the despatch of merchandise in the fashion named should be by night as far as possible. Thus goods sent from Liverpool or Manchester at seven o'clock each evening would reach their destination the first thing the following morning. It is believed that a fully loaded train of three wagons can be drawn at a uniform speed of six miles an hour. — *N. Y. Evening Post.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

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AN interesting case, concerning the rights of the lowest bidder, was tried in New York the other day. Bids had been invited for the paving of Kingsbridge Road, and the plaintiffs, Pennell & O'Hern, complied with all the necessary formalities, and submitted a tender which was proved to be the lowest one received. Nevertheless, the Commissioner of Public Works refused to accept it, and awarded the contract to some one else. Pennell & O'Hern, in consequence, sued the city for damages, claiming thirty thousand dollars. The case was tried with a jury in the Trial Term of the Supreme Court, and a verdict in favor of the plaintiffs was brought in, with damages to the amount of five thousand dollars. Lest any one should suppose, however, that this favorable result was due to the discovery, by the jury or the Court, of any inherent right of the lowest bidder to employment, it may be well to say that the case could only turn on the terms of the statute under which bids were invited, or, possibly, on those of the invitation. It cannot be too strongly impressed upon the minds of contractors that, unless some statute, ordinance, resolution or other official act prescribes that the contract, in a given case, shall be awarded to the lowest bidder, the law presumes that the persons whose duty it is to make the award are entitled to use their discretion in the matter, and to award the contract to such persons, and in such manner, as they may deem for the best interest of the community for which they act.

A STRIKING illustration, not only of the usefulness of the New York Building Department, but of the importance of providing adequate means for securing its care to all parts of the city, is to be found in a recent occurrence. One of the inspectors of the Department, passing a seven-story building in process of erection in the lower part of the town, noticed that one of the walls leaned slightly. He took mental note of the building, and, some time later, he arranged his regular round so as to pass it again. It seemed to him that it leaned more, and he notified Superintendent Constable, who came promptly to the spot. A few measurements showed that the wall was already twelve inches out of plumb, and still moving. The Superintendent is a man of resource and decision, and, instead of going through the formal routine of notice to the owners, which would probably have cost the lives of several people, he sent for wire ropes, and soon had them passed around the walls, and tied back to neighboring buildings, in such a way as to keep the new structure from falling outward into the street. Meanwhile, the contractor was summoned, and required to take down the defective walls forthwith. Thanks to Mr. Constable's effective staying, this work was accomplished without accident, and what might have been a lamentable catastrophe was averted.

MR. JAMES H. GREATHEAD, an engineer known throughout the world for his invention of the system of tunnelling called by his name, died recently, at a comparatively early age. His experience in submarine tunnelling dated from a very early period. As a draughtsman in the office of Sir Marc Isambard Brunel, he was engaged in the designing and supervision of the first Thames Tunnel, and became thoroughly familiar with the difficulties to be encountered in such work. The first result of his observations was the invention of the water-shovel, by means of which the water itself, driven under pressure against the solid earth in front of the tunnel heading, is made to disintegrate it, so that it can be removed in a half-liquid condition by means of pumps, the workmen being guarded meanwhile by a shield. This method has been in use ever since for such works, and has recently been successfully extended to excavation for foundations of buildings. His health being delicate, he was obliged to leave England for a time, and lived for about ten years in India and Australia, actively engaged as consulting engineer for railway and bridge construction. Returning then to London he became interested in the City and South London Underground Railway, which was built by his system under the Thames from London Bridge to Southwark. The success of this line, which, unlike most of the other London underground roads, pays dividends, led to the construction of another on the same system, which is now nearly completed. Mr. Greathead was employed on this, as on the South London road, and, in the course of his studies, invented and patented several improvements on the shields used in the work. Naturally enough, the projectors of the Hudson River Tunnel, the most important submarine tunnel in this country, sought his advice, and he was associated with Sir Benjamin Baker as consulting engineer for the work.

THE Supreme Court of Massachusetts rendered recently a decision, on appeal, in a case of intimidation, which is interesting, not only for the opinion of the majority of the Court, on which the decision was based, but for the dissenting opinion of two of the judges. The facts of the case were, briefly, that the employés of a certain furniture-maker in Boston struck, and the International Furniture-Workers' Union, in order to prevent him from hiring men in their places, maintained a patrol in front of his premises, to intercept and threaten, or expostulate with, persons who might intend to apply for work. The plaintiff applied for an injunction to prevent this patrolling, and after repeated appeals, the full bench of the Supreme Court holds that he is entitled to such injunction. The Court does not consider that it would be unlawful for an organized body of workingmen to establish a patrol of men charged simply with the task of arguing rationally with applicants for work; but the evidence showed that the patrol actually threatened "personal injury and unlawful harm" to persons seeking employment in the plaintiff's establishment. Such conduct, the Court says, is in contravention of the right, secured by the Constitution to every employer, of engaging able persons who are willing to work for him at such prices as may be mutually agreed upon, and of persons employed, or seeking employment, to enter or remain in the employment of any person or corporation willing to employ them, and the person suffering from it is entitled to an injunction. A rather queer argument was put forward by the counsel for the defendants, that, as the conduct complained of, if unlawful at all, was, under the statutes of Massachusetts, criminal, and therefore punishable by the usual processes of criminal law, an injunction could not be issued to prevent it; but the Court replied to this that, while a Court of equity will not ordinarily issue an injunction to restrain the commission of crime, a continuing injury to property or business may be enjoined, although it may also be criminally punishable.

TWO judges, Field and Holmes, dissented from the opinion of the majority of the Court. Chief Justice Field could, apparently, see in the conduct of the patrol, as described in the evidence, only "a peaceful mode of finding out the

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persons who intend to enter the plaintiff's premises to apply for work, and of informing them of the actual facts of the case in order to induce them not to enter the plaintiff's employment," and the illegality of such conduct seemed to him too doubtful to justify an injunction. Judge Holmes, who also dissented from the opinion of the majority, took much more radical ground. Passing over some objections which he found to the language of the injunction, his opinion says that "In numberless instances the law warrants the intentional infliction of temporal damage, because it regards it as justified." As an illustration of this, he says that "It has been the law for centuries that a man may set up a business in a small country town, too small to support more than one, although thereby he expects and intends to ruin some one already there," and he explains that the doctrine under which such things are permitted is that "free competition is worth more to society than it costs." As he draws important inferences from this principle, it may not, perhaps, be amiss to observe that "free competition," and "the intentional infliction of temporal damage," are two quite different things. Free competition may involve the unintentional infliction of temporal damage, but in law, as in morals, the intention is everything, and even Judge Holmes, further on, seems to get into some trouble with his theory. In the illustration which he gives, although he says of the person who sets up a competing business in a place only large enough to support one business of the kind, that he "expects and intends to ruin some one already there," he cannot mean to say that an effort of a man who has to make a living for himself and his family to get custom or employment, even though the custom or employment that he gets may be taken from that which some one else has previously enjoyed, is the same thing as an intentional attempt to "ruin" his rival, or that the law makes no distinction between them. While the law, in general, considers that all men are equally entitled to try to earn a living by such honest profession as they may choose, it frowns upon perfidious attempts to steal away another's customers, and certainly, no jurisprudence at this day would sanction malicious injury under the pretext of competition.

ALTHOUGH Judge Holmes, in his next sentence, seems to retreat a little from his position, by saying that "the infliction of intentional damage is justifiable only when it is done not for its own sake, but as an instrumentality in reaching the end of victory in the battle of trade," it seems to us that he obscures the point of this explanation, which is assuredly a most important one, by the loose way in which the expressions, "victory," and the "battle of trade," are used. Further on, in a similar manner, he speaks of "free competition" as a narrower expression for "free struggle for life," and explains this idea by saying that "One of the eternal conflicts out of which life is made up is that between the effort of every man to get the most he can for his services, and that of society, disguised under the name of capital, to get his services for the least possible return." It would be interesting to know what evidence a judge, as distinguished from the Socialistic phrasemongers, finds to support the notion that life is made up of "eternal conflicts," or that one of these conflicts consists in a struggle about wages between "Society," or "Capital," and the rest of the world. It is hardly necessary to say that the law, in Massachusetts, has hitherto known nothing of "Society," or "Capital," or "struggles for life," or "eternal conflicts," but has uniformly looked upon the citizens of the State, whether rich or poor, whether employers or employed, as persons of exactly equal rights and responsibilities, presumably engaged, not in "struggles," or "eternal conflicts," but in pursuing mutually useful callings in an honorable and considerate manner. The exchange of this ideal for that which contemplates mankind as a drove of biped swine, each bent on securing for himself, at the expense of his weaker brethren, the largest morsels of garbage, is something for which the community, outside of the Socialists and Anarchists, is hardly yet prepared, but it is difficult to see how anything else could be meant by the acceptance, as a basis for legal decisions, of the notion that the relations of any two citizens, or bodies of citizens, can be those of an "eternal conflict," or warfare of any kind. Judge Holmes says that citizens, in their controversies, cannot "be permitted to usurp the State's prerogative of force"; but if "the intentional infliction of temporal damage" is allowable as a manœuvre in the "eternal conflict," it is hard to see on what principle jurisprudence could define the limits of the kind or degree of injury to be inflicted. The law says that in "struggles for life" between individuals, either party is justified in killing the other, and if anything of the kind really exists between classes or bodies of individuals, the Anarchist view, that the extermination of one class by the other is justifiable and praiseworthy, is the only logical one. The difficulty with this deduction is not in the reasoning, but in the premises. If a state of "conflict," eternal or otherwise, legally exists between two men, or sets of men, the individuals on either side are entitled to the privilege of combatants, that is, the "intentional infliction of temporal damage," within the rules of warfare, which include the killing or maiming of the enemy. If no state of conflict exists, it is not easy to see how any intentional injury to another person can be justified. Judge Holmes says that free competition involves occasional injury to others, which is true, but it is incidental, not intentional injury, that is involved, and the limit of incidental injury should be simply the equalizing of opportunities between two persons with equal rights. It is the attempt by one party to inflict an intentional injury upon his competitor, as he would upon an enemy, which converts competition into warfare; and, however Socialist sophistry may confuse the two things, civilization and liberty rest on the distinction between them.

THE story of the discovery in the mountains of Mexico of a buried city, "larger than New York," is repeated in the newspapers, with more circumstance than before, and we are informed that the ruins cover an area of "about one thousand square miles"; that they include the remains of twenty temples, besides two pyramids, and that the objects already dug up "prove" that the town "was at some time one of the great centers of wealth and power of the American hemisphere." It is naturally interesting to know what may be the character of the objects which "prove" such an important truth, and we are informed that the "subterranean chambers" of "the largest buildings" are "filled with broken pieces of plaster, painted bright red and white," and, on the floors, are found "beads, axes, idols and broken pottery"; while, in another place, "under the altar," at a depth of nine feet from the surface, was found an earthen pot, which was "filled with dirt," and mixed among it were seventy-two objects of mother-of-pearl, all perforated, and five of them were heads of Kings, with crowns nicely carved. The inhabitants of this Aztec metropolis showed rather unusual taste in packing away the effigies of their kings in bean-pots "filled with dirt," and it is to be regretted, in the interest of history, that they had not devoted their "nice" carving to the countenances of these royal personages, rather than to their crowns; but the inhabitants of a city of a thousand square miles in area can hardly be judged by ordinary standards. Besides the contents of the bean-pot, and the "beads, axes, idols and broken pottery," with the broken pieces of red and white plaster, the finds hitherto secured appear to include only some "bones of strange animals," a portion of which, it is pleasant to find, have been "carefully packed" for expert examination. For the benefit of science, it is made known that the ruins are situated in the State of Guerrero, not far from its capital, Chilpancingo, and are locally known under the name of Quechomitlipan.

THE new Prefect of the Seine, M. de Selves, in imitation, perhaps, of Mayor Quincy, of Boston, has created a Technical Committee, whose duty it is to advise him in regard to all projects relating to architecture or fine-art prepared for the Department of the Seine. This Committee, which is composed of painters, sculptors, engineers and architects, and includes a contractor, is to hold regular meetings, under the presidency of the Prefect himself. The Parisian architects do not look with much favor on this innovation, and inquire what the Committee will find to do; but it is altogether likely that M. de Selves understands what he is about, and that his advisers will be able to render the service for which they are appointed. In the case of the Mayor of Boston, the establishment of a "Cabinet of Experts" seems to have amply justified itself, by the importance and value of the counsel which its members have already given in regard to the building-matters of the city, and in Paris, where many schemes of improvement are under consideration, the responsible executive head of the municipal government may quite naturally feel it desirable to have the guidance of experienced advisers in technical matters, instead of depending for his decisions on his own fancies.

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THE THIRTIETH ANNUAL CONVENTION, A. I. A.[1]—II.

NATIONAL ARCHITECTURE: CERTAIN CONSIDERATIONS WHICH MIGHT POSSIBLY AFFECT THE DESIGN AND CONSTRUCTION OF OUR BUILDINGS.[2]

THE purpose of this paper is not to revive the time-honored discussion of the evolution of a style of architecture for these United States of America — and then with a "*whereas*" and a "*be it resolved*" to move that the matter be referred to a committee, with the recommendation that this American Institute of Architects do hereafter recognize only such-and-such proportions, or combinations of mouldings or of materials, as rightly constituting a national style of architecture.

I have no doubt that there are members present to-day who have listened to, or perhaps themselves have read, carefully-prepared papers on "An American Style of Architecture" before some of the earlier conventions of the Institute: certain it is that the contributors to periodicals, professional and otherwise, have agitated the subject for the past twenty-five or thirty years, with the apparent hope that the mooted question could be settled within a very few years. Nor is it my intention, as the guardian of the Government's interests in matters architectural, to predicate, or even to recommend, that the future court houses, custom-houses or post-offices throughout this broad land of ours should be designed in any one school, or that they should all be constructed from any one specific material, but I beg leave to offer the following memoranda of principles, tending to the begetting of logical architecture, and which, having been proven in past ages, cannot fail to be of most lasting benefit to us in our efforts towards the realization of a National architecture.

The influences most potent in the evolution and development of architecture may be classified in three groups, namely:

(1) Geographical, Geological and Climatic.
(2) Religious and Social.
(3) Historical, Political and Commercial.

As we trace the history of mankind we find that the Geographical, Geological and Climatic conditions have been of prime importance everywhere; in Egypt, Chaldæa and Assyria; India, Greece and Italy; Spain, France and Holland; Germany, Norway and England.

Lower Egypt (which Herodotus calls "the gift of the Nile") Chaldæa (a second Holland) and Assyria, (a more undulating country) were built virtually of sun-dried mud and fire-burned clay. Syene and kindred quarries of upper Egypt supplied the granitic rock for temples, tombs, pyramids and obelisks.

In India we are familiar with the Taj Mahal, the temples and water approaches of Benares, the rock-cut temples of Eliora and Elephantiné. We have all studied the orders from the marble temples of Greece and her colonies.

In Southern Italy we find frequent use of marble, in Central Italy of peperino, tufa, travertine and concrete, and in Northern Italy of brick and terra-cotta.

Spain suggests the use of tiles for roof-covering and for the ornamentation of interior wall-surfaces, with granites, sandstones and limestones for the construction of walls, piers, vaults and bridges.

In France the local material of Auvergne is volcanic rock; of Brittany, gray granite; of Normandy, the beautiful Caen stone, and, farther to the north, brick and half-timber, or "*pan de-bois.*"

Dutch tiles would never be mistaken for Spanish, nor Dutch brickwork for that of Northern Italy, and yet the architecture of Holland is essentially ceramic. The various portions of Germany show the use of limestones, sandstone, brick and half-timber respectively.

The log châlets of Norway, Sweden and Switzerland certainly give a clue to the geography, geology and climate of those countries.

English architecture, perhaps more than any other, has been affected by influences beyond these three primary causes, but it has been because of England's geographical position more than for any other single reason that these influences have affected her in a greater or lesser degree, and the paradox of the spirit of ardent investigation, coupled with that of the utmost conservatism, is surely as admirable an instance of "*les défauts de ses qualités,*" or *vice versa*, "*les qualités de ses défauts*" as can well be imagined. It is very interesting to note next how the architecture of various nations has been affected on the one hand by Religious and Social influence, and on the other by the Historical, Political and Commercial. The Egyptians built their residences of mud and clay, and reeds and sticks in a most temporary fashion, but their tombs, which they accounted their true homes, were of the most enduring stone obtainable. There is a difference between not only the residences of Egyptians and Greeks, but — even more so — between their temples, for, whereas the former constructed a multitude of columns and surrounded them by blank walls, the latter placed the edifice proper within and the columns without. The erection of theatres by the Greeks, primarily for the celebration of religious rites, was the beginning of the Social influence upon architecture, and when the baths of Caracalla and Diocletian, the palaces of Augustus and Nero, the villas of the Emperor Hadrian near Rome and of many wealthy private citizens at Pompeii, Baiae and other resorts were built, then the social side of life was most prominently expressed.

The religious wars or Crusades of the Middle Ages undoubtedly produced marked results upon the buildings of Western Europe by the gradual importation of Eastern architects, mechanics and materials.

The feudal system was powerfully expressed not only in the fortified castles on the hill-tops, but, as in Florence and elsewhere, within the very cities themselves.

It is a singular fact that generally in countries where stone was plentiful and to be had of large dimensions, the interiors of buildings were gloomy, though the general impression may have been one of awe; whereas no interior has ever before or since equalled in joyous grandeur and cheerful dignity the dome of Santa Sophia, which Anthemius built of brick for the Emperor Justinian.

From the tenth to the fourteenth century was the great church-building age of Europe. At first the early Christians began by remodelling and adapting the Roman basilicas, then by using materials of Pagan temples for the construction of their churches, and finally, after passing through the transition of the Romanesque and Norman (when the principles of the Gothic vault and pier and buttress were fully known), were evolved those magnificent productions of master minds, the cathedrals of Paris and Amiens and Bourges and Chartres.

Next came the age of the villa in Italy and the château in France; in the former they were grouped about the cities and always preserved certain formalities in their details and urban traits in their composition, and in the latter they were especially picturesque and suggestive of the country.

As civilization has advanced, we notice that the Religious impress has grown less, and then the Historical, and afterwards the Political, have each in turn lost somewhat of their former importance, while Social and Commercial influences have grown with rapid strides. Even in the time of the Crusades, Venice, while furnishing ships and men for these holy wars was not slow to seize the opportunity for enriching herself, not only in ducats, but precious materials of all sorts for the construction and decoration of her palaces and churches, not disdaining an occasional sacred relic.

Later on, François I imported Italian architects and artificers into France; while the commercial spirit which has always existed in England developed the tendency to adopt (and sometimes to get) the best of her neighbors.

With us in America, especially in our larger cities, this commercial spirit clamors most continuously for recognition, and the high prices of land, the phenomenal growth of cities and the use of elevators, of iron and steel and fireproofing materials and of electricity have forced upon us the solution of entirely new and untried problems.

In connection with these reflections upon the evolution of a national architecture in foreign lands, it is well for us to contrast the relative area of these countries with portions of our own United States, and to consider also the isothermal lines of the Old and New Worlds. Compare, for instance, the size of Old and New England; the republic of France with the Lone Star State; the Kingdom of Italy with California; and at the same time remember how, in the Old World the style changes with very few degrees of temperature, each geological deposit, and under all geographical conditions; and that the peristyle and pediment, the deeply overhanging cornice and the *cortile* are indigenous to Southern climates, while the dormered roof and peaked gables belong to sections of rain and snow.

As a result of the exhibition at Philadelphia of 1876, interior decoration and ornament certainly underwent a change in this country, and with the exposition at Chicago in 1893, a greater simplicity and refinement has appeared in the design of exteriors. In 1876 it was Japan and India that produced the effect upon us. In 1893 it was Greece and Rome — through the medium of the École des Beaux-Arts at Paris. The greatest triumph of France at the Exposition of 1893 was not that achieved within the walls of the many buildings where she was represented, but in the influence of the École des Beaux-Arts, on the general arrangement, proportions and details of the chaste and beautiful Art Building and of those magnificent structures forming the Court of Honor. Where in all the history of Rome, of Greece, of London, of Paris herself, is there anything comparable?

Therefore, bearing constantly in mind the manifold requirements and many-sided conditions which contribute to the healthy growth of our profession, let this success of 1893, where architects worked together with unexampled *esprit de corps*, be an incentive for even more admirable results in a logical architecture and, without question, the problem of our National architecture will solve itself in due time.

REPORT OF THE COMMITTEE ON BUILDING LAWS.

YOUR committee has no service to the public to report this year. Although it has reason to suppose counsel would have been valuable in several instances, where new codes of building regulations were under consideration, it received no request for its advice, and did not consider it desirable to intrude its services without invitation. At the same time, your committee believes that if suitable means could be taken to inform the public of the fact that the Institute maintains a standing committee for the purpose of furnishing, gratuitously, to communities or persons who are considering matters of building legislation, such information and suggestion,

[1] Continued from No. 1088, page 39.
[2] A paper read at the Thirtieth Annual Convention, A. I. A. by Wm. Martin Aiken, Supervising Architect of the Treasury Department.

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as the principal professional body of the country can supply, and some evidence should be given of the qualifications of this committee to advise in such matters, its services would be sought, not only by communities desiring to avail themselves of its special knowledge, but by legislative committees, which, by referring technical questions to such an authority, could avoid the importunities of selfish interests, which are too often able to pervert building legislation for their own profits. As more rational and uniform building-laws would considerably lighten the labor and anxiety of architects, your committee suggests that the Institute might with advantage undertake the preparation of a tract on building-laws, comparing the practice of different localities and different countries, and endeavoring to make it comprehensible and useful to the general public. The library of the Institute already contains the most important work on the subject ever issued, the "*Manuel des Lois du Batiment*," of the Société Centrale of France, and it would be a matter of small expense to collect the building codes of all the principal cities in the world, most of which could be obtained gratuitously by the Institute. With this material, your present committee, or such other committee as the Convention might appoint, should be able to prepare a treatise of permanent value, which might first be published as a part of the Convention *Proceedings*, and separately printed in pamphlet form as a tract for distribution. On application from a Fellow of the Institute, copies of this tract might be properly sent to city officials, or members of legislative committees, and could hardly fail to be of benefit. It seems to your committee that in some such way as this the Institute can not only perform without intrusion a public service, which it is better qualified to render than any other part of the community, but may, in a dignified manner, call attention to its position at the head of the building interests in America. After the committee in charge of this tract had finished its work, the documents which had served in its preparation should be kept together, as a record of the condition of the art of building throughout the world at the close of the nineteenth century. This record would grow every year more valuable, and your committee hopes that the time may not be long until the Institute is established in permanent quarters, where such records may be consulted and continued, and from which its publications of general interest may be issued.

T. M. Clark, *Chairman.*
N. LeBrun.
Alfred Stone.

THE INFLUENCE OF STEEL CONSTRUCTION AND PLATE-GLASS UPON MODERN STYLE.[1]

I MUST confess to a little doubt as to the intention of this inquiry. I shall, however, proceed upon the supposition that what is meant is to discover in how much and in what way the use of steel construction and plate-glass has affected the forms of masonry design? It is evident, I think, that unless the employment of these agencies has caused some modification in the design of buildings where they are *not* employed, that their influence terminates in their own development, in which case they must be regarded rather as additions to the resources of modern design than as modifying factors in it.

An illustration will make this clear.

When the Gothic builders found a method of lightening their vaults by concentrating the weight on the ribs, and incidentally discovered the practical value of the pointed arch, a change in architectural style followed. The round arch soon disappeared even from walls unconnected with vaulting, and the new forms, introduced as engineering expedients, made their influence felt even in matters of pure decoration.

Now what we have to consider is, whether the introduction of steel-skeleton construction is going to produce a revolution in style at all comparable in nature to the one just instanced?

I think not. My first reason for thinking so is the direct one, that I can see as yet no evidence of any change in masonry design which can, with justice, be attributed to the influence of steel-framed buildings. The second reason is the theoretical one that the use of steel has introduced no new constructive principle. The way in which steel does its work is in no essential respect different from the way in which wood does its work. No different principle is involved. Steel has greater strength than wood, and it will not ignite, but that is practically the extent of the difference between them as constructive elements. Each requires some sort of protection from moisture and fire.

There is, however, one feature of steel-framed buildings — I mean always those in which all masonry is carried on the framing — that might at some time become an agent in modifying the design of pure masonry façades, although it has not yet done so. I refer to the envelope which covers the steel framing. I have never particularly admired the panelling treatment of parti-colored marbles given by Giotto to the Campanile at Florence, because its composition of lines fails to *accuse* the idea of solid masonry behind. It is too purely decorative, suggesting wainscoting, and is akin to the false treatment given many Italian church façades of the frontispiece type. In a word, it is not *expressive* in its suggestion.

Now the same reason which would lead one to condemn this veneer treatment for a good wall of masonry, leads one to condemn a masonry treatment for what is really a veneer. The treatment that is wrong in the Campanile would be right in the steel-framed façade.

This being so, it is possible that a time may come when the beauty of such a treatment of the envelope of steel buildings will so possess our minds that its influence will be felt in the design of masonry buildings. This possibility, however, is too remote to be reckoned as a present influence upon modern style.

Nor do I think plate-glass can be counted as such an influence. It should be considered, like steel construction, rather an addition to our resources of design than as a factor modifying them. There is nothing in plate-glass which compels our invariable use of it in large sheets, and so drives out before it the employment of mullions, muntins and leads. With steel construction we should have had the same great shop-windows we have to-day, even if the casting of glass in plates had not been invented.

It must be conceded, however, that by reason of its mechanical perfection, its freedom from flaws, and its admirable polish, plate-glass exerts what influence it has to procure for it a setting in harmony with these characteristics.

Architecture has always been swinging back and forth between two extremes, which are marked respectively by indifference to mechanical finish and by delight in it. Your brilliant painter amazes his Philistine client by his unconcern about the finish of his brush-work. The client sets smoothness of finish above the qualities the painter regards, because he is not a craftsman like the painter. The unevenness which the client finds a blemish, may be to the painter the mark of his freest and truest touch. So there are certain types of architecture to which the individuality and touch of the craftsman lend a large part of their charm, whose very virtues are based on the happy use of the accidental, and whose effect is the opposite of formalism. These are the picturesque types. On the other hand are the formal types, where charm resides in the submission of all parts of the work to a central authority, and where the individual note in any part is a defect, rather than a heightening of the general effect.

It is to this latter class of architectural styles that plate-glass is naturally allied, by reason of having the same kind of virtues. It may be said, therefore, to be always silently exerting what influence it has in behalf of classical architecture. Yet I think this influence will not be considered great enough to modify our previous conclusion that modern style has been left unaffected by steel construction and plate-glass.

[1] A paper by Mr. Robert D. Andrews read at the Thirtieth Annual Convention, A. I. A.

REPORT OF THE COMMITTEE ON EDUCATION FOR THE YEAR 1896.

AT the Twenty-eighth Convention of the Institute, held in 1894, this Committee in its annual report ventured the proposition, whether the methods of instruction in our schools, especially the study of the historical styles, might not be so directed as ultimately to lead to a higher comprehension of our professional responsibilities in relation to the development of a system of architectural forms which should be more accurately adjusted to the expression of modern American civilization than those which at present prevail; whether, in short, we should continue to allow ourselves to drift towards some unknown result, or endeavor to control the current, keeping it within reasonable bounds.

In accordance with the request of the Institute, the Committee, with the above object in view, opened a correspondence with the Directors of the schools, partly to show our general interest in their work, but more especially to ascertain to what extent and in what way a knowledge of the spirit underlying the development of the historical styles was inculcated. Some of the replies received were printed with the Committee's report of last year. They conveyed to the Institute, on the whole, an agreeable impression of the intelligence and thoroughness with which this branch of architectural study was pursued in the schools.

But the Committee, in its report of last year, after reciting these facts, ventured to suggest what might prove a practical method of bringing about the results aimed at in the report of the previous year. They proposed to refer to the post-graduates of the schools, now become active practitioners in the profession, and to the members of the Institute in general, the consideration of these larger subjects, which the limitations of the schools prevent them from properly treating.

With this in view, the Committee has been encouraged to propose for open discussion in the present Convention, a subject which seemed to them of sufficient interest to awaken active discussion, and of sufficient importance to call into play the best intelligence of the profession. Several members of the Institute have been good enough, at the request of the Committee, to prepare essays on the theme chosen, viz., "The Influence of Steel Construction and of Plate-Glass on the Development of Modern Style." These essays will be read at this Convention, in order to open the way for a discussion which, it is the hope of the Committee, may become general, the subject having been duly published to the members of the Institute to this end.

If this discussion should prove to be a distinctive and satisfactory feature of the present Convention, it is hoped that it may form an inspiring precedent for those which are to follow, and that thus the proceedings of future conventions may have, at least, one element of

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permanent value to the cause of good architecture, and one which in attracting the attention of the thoughtful men outside our profession, may cause our work and our aims to be regarded with increased respect and a more intelligent sympathy.

HENRY VAN BRUNT, *Chairman.*

INFLUENCE OF STEEL CONSTRUCTION, AND OF PLATE-GLASS UPON THE DEVELOPMENT OF MODERN STYLE.[1]

THE human race finds itself endowed with two distinct classes of desire — one to perpetuate, the other to enjoy its existence. What necessity requires seldom performs its office without administering to the desire for pleasure. Utility makes her demands to perpetuate life, art to provide enjoyment. While the capacity of the race to provide was exhausted in supplying its necessities, art was impossible. It was only when he had so far conquered the forces of nature as to leave some time and some energy unexpended, after his needs were supplied, that man could, or did, turn his mind to the contemplation, and his hand to the realization of that which was ornamental. It is only out of the surplus strength of hand and brain that works of art proceed.

That branch of art, to which, as architects, we are devoted, had its origin in an attempt to beautify the buildings which primitive man found necessary for his shelter while alive, for his tomb after death and for a place where he might pay respect to the supernatural.

Architecture is purely an art of space, as music is of time — an art of light, as music is of sound — an art which appeals to the eye, as music does to the ear — an art which produces its effect by composition of line, form and color, as music does by composition of rhythm, melody and elocution — an art which is removed from an aggregation of heterogeneous forms and inharmonious colors, as far as music is removed from a mingling of discordant and conflicting noises.

Buildings which only pay respect to necessity, might be called the noise of architecture. Those which consider quality as well as quantity introduce an organization of elements through which an artistic result may be produced. The varying ratio of energy devoted to the needful in a material sense, and to the desirable in a spiritual sense, measures the progress from the absence of architectural art to its highest development.

Architecture being an art of precedence, forms and motives when once accepted tend to perpetuate themselves in use, even for long periods after their original meaning is forgotten — possibly in materials for which they were not intended, and in which they never would have been produced. It was many a century from the early timber buildings of Egypt to the mastabas of the fifth dynasty, and yet we have the crystallization of wood construction in these later productions in granite and limestone. It was two thousand years from the wooden sun shelters of Chaldæa to the palaces of Essarhaddon, but some of the details familiar to the eye of the early ages, when both civilization and architecture were in a formative condition, were retained in the best materials the later Mesopotamian empires could furnish. Some of the details in palaces of Assyria, which were built two hundred years before the time of Pericles, not only were transported twelve hundred miles to the new civilization on the Mediterranean, but were carried from their origin in sun-dried brick to the marble of Classic times. The guilloche from the palace of Assurbanipal, and which was older than Hellenic civilization, is still retained among us as one of our most effective ornaments.

But not greater was the conservatism which resisted any change in form and decoration, in the empires of antiquity, than is the conservatism of more modern times — even in our own country, in the nineteenth century. While we claim to be free to adopt any detail we please, we are, nevertheless, copying the detail of past ages — not only using it in the material where it reached its perfection, but in any other material that we have at hand, and without reference to whether the material is suitable for the detail or not, and without much thinking of the place and manner in which it was formerly employed.

The cause of this tenacity of historic forms rests, probably, in the fact that the most fertile mind — much less the average designer — is not able to produce, from the use of the material and the purposes in the structure, an entirely original supply of forms, especially within the limit of the time allowed for the purpose. This demand for more than can be wrought out for the occasion, causes continuance in the habit of copying — copying even thoughtlessly — from existing buildings and familiar designs. Again, through the sense of sight, forms fix themselves in the mind, and when the designer is called upon to use *some* form, he naturally turns first to those which "hang on memory's wall."

But while this tenacity of old forms must be recognized in the consideration of our subject, it is equally true that no material has ever become the chief, in a class of buildings, without lending the influence of its qualities to the design of the structures where it was used. Very soon a new requirement has arisen that could not be met by the old materials, and for which the new would answer — and the new was forced into prominence — lending a new quality, in proportion or detail, to the design.

But what is new must begin with the old as a basis, so that the style of our times will be influenced not only by new materials brought into use, but also by those which have been in use, and which have already lent their impression to the work of the past; because architecture is a record of the past, as well as a statement of present conditions.

Our subject is undoubtedly intended to include not only past, but future influence as well, upon the development of style. The past will be historic, the future prophetic. There is not as much to disagree about in that which has passed, as in that which is to come, and yet no two persons will make quite the same selection of facts from which to form an opinion, even of what now exists — hence, opinions must differ. But when it comes to that which is to occur in the future, the field for difference of opinion widens. It may be that opinions printed now will be read with much mirth — if they are read at all — after what is to happen has happened. But with all the past as a foundation — as a base upon which to support predictions of the future — it may be that some little part of the future can be estimated.

The materials of which buildings are erected always affect the design to a greater or less extent. All historic styles of architecture possess certain peculiarities of form and detail induced by the character of the material, in the use of which the style was developed. Any style will have a definable relation to the materials available when it is undergoing formation. History presents some interesting proofs of the influence of material on style. The great buildings of the Nile Valley, which have lived to carry the story of Egyptian civilization across a silence of so many centuries, bear unmistakeable evidence of the abundance of stone at the beginning of Egyptian greatness, while the ancient Mesopotamian cities could rise from their earth-bound sleep of two thousand years and exhibit their buildings to prove the scarcity of stone in that country, when Ourkam bid his nation of thinkers erect temples for the worship of Istar. Even the Greek, who crystallized the toys of his youth in the monuments of his manhood, never forgot the timber which built the shelter for his ancestry, although he petrified his houses of wood into temples of marble.

The wonderful difference between the proportions of modern buildings since steel construction has come into use, and those which were the prevailing custom prior to that date, is noticeable upon all hands, particularly in this country. The most remarkable of these changes is the extraordinary height to which buildings are now carried in some American cities. Another noticeable change, is the great unbroken window surface closed-in by plate-glass, which prior to the present age was impossible. Not only the exterior, but the interior of buildings, has been greatly changed by reason of steel construction. Vast floor-spaces are now opened up, with but a few small supports for what is above, and the same is repeated story after story. To whatever extent plate-glass has made it easier to furnish light, its use has resulted in great benefit to humanity, whether it has overturned former architectural notions or not. To whatever extent steel construction has made it possible to have lighter, better and safer buildings, more ample and better arranged floor-space, more comfortable and safer offices, it has been a benefit to mankind, even though it may have entirely overreached our ability to govern it, as an architectural element. No more need be said of the possibility of extending floor-space without being broken by roof supports, than to call attention to the main hall of the Liberal Arts Building at the Columbian Exposition at Chicago, a room some 400 feet wide, 1,200 feet long and 200 feet high, without a post or pier anywhere to break the well-nigh boundless continuity of floor-space. In this direction it may be said that steel construction opens up a possibility of greatness hitherto unknown. This is one decided influence already realized. If you say it is more a feat of engineering than of architecture, I say, in reply, that this is only because architecture has not been able, as yet, to measure up to its privilege, under the reign of glass and steel. While these possibilities have had an extensive influence upon the height of buildings, the extension of rooms and the question of light, considered in a practical sense, it is, perhaps, not the direction in which we are supposed to discuss this question.

Let us turn to the influence that steel and plate-glass have exerted upon the exterior of these buildings. Here their influence is written in legible lines by the numerous *attempts* which have been made to vary the proportions of historic styles of architecture to fit the requirements which have come with the use of these two hitherto unknown materials. These *attempts* are mostly failures, as viewed from an artistic or architectural standpoint — no, they are not failures, they are only unsuccessful efforts. They are not failures, for they prove to us what *not* to do, and that we must know. Their influence is negative, but it is wholesome. They prove to us that our ideas must be reformed and expressed in a different architectural language. Up to date we have witnessed the building of walls — or what seemed to be walls — 200 feet high, supported only on small piers, scarcely able, if they *were* piers, to sustain their own weight. We have tried hard to admire the result, but have failed. The untruthfulness of the expression was too evident. Then, we have built walls very plain and simple, and that seemed to have a negative kind of merit, but we were not satisfied with it. Next, we have tried to decorate the façades — supposed to be walls — with forms from one style of architecture or another, and, like the man with the roads in Arkansas, whichever style we have tried, we wished we had tried some other one. Then we have lost our patience and decided

[1] Paper by Mr. J. W. Yost read at the Annual Convention, A. I. A., Nashville, Tenn., October 21, 1896.

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that steel, as a building material, was a destroyer of our peace, and we have tried to get city councils to pass ordinances, saying that steel construction should not be allowed. We have tried to drive it out of town, by limiting the height to which buildings might go. Then, when we find these efforts a failure, we go back and try some other style of architecture, and perhaps we plaster the details of a Greek temple or Venetian palace all over a sixteen-story front, and try to comfort ourselves with the fact that we have done as well as anybody else. We place columns one, two and three stories high, upon the top of one another, or by interspersing them with a few tiers of impossible arches produce a sort of architectural grille, which looks as if it ought to be built lying down, as it apparently has no ability to stand up. And we feel "real mad" at some newspaper critic for saying that "it looks as though the builder had got hold of the elevation with the wrong end up." After this, we meet our brethren of the profession, afflicted with similar tribulations, and we solemnly resolve that tall buildings are an architectural monstrosity. This seems to be the history of the past. It is largely a record of our failure to accommodate our architectural notions, and the details of historic styles to the new conditions induced by the use of steel and plate-glass. But what of the future?

It so occurs that plate-glass and steel construction are directly opposite in character, and yet both work toward the same end. The steel may be said to be the positive quantity, and the glass the negative quantity. The steel is the solid — the glass the void. The glass can fill the space which the more positive material does not care to occupy. The great strength of steel posts tends to reduce the width of piers, the glass stands ready to fill the increased space between. The strength of steel girders tends to widen the space between posts, and the glass is ready at hand for the greater duty of closing the larger opening. It may be said therefore, that if steel construction is the master, plate-glass is the faithful servant. The great strength of steel has a tendency to reduce the solids and increase the voids, to reduce the thickness of walls, and decrease the depth of shadows. The character of posts and lintels is such as to induce the use of straight lines, and the same influence is exerted by the difficulty of using curves in the windows filled with plate-glass. The influence of these characteristics would be in the direction of angularity of style.

Being a material quickly affected by fire and weather, steel must be enclosed by some shield for protection. Instead of its brick or terra-cotta covering attempting to preserve the appearance of a wall, when it has lost the substance of a wall, it will, by-and-by, fall into its true position as a covering for the steel, and begin to take the form of, and exhibit, probably in conventionalized form, the detail natural to the steel construction itself. Already it is seen that to attempt to make a building, the frame of which is steel, look like a stone building or a brick building is a caricature on all decent building art. It is not less an architectural fraud — an artistic monstrosity — to imitate a brick building by the forms used, when steel constitutes the chief building material, and when the brick, if left alone as it appears, would not stand for a moment. But as the steel will give certain suggestions to the form of the covering, which are natural to the steel construction and not to the covering material, the material used for the covering, on the other hand, will tend to give to the design certain of its own peculiarities. Hitherto the covering has practically given all, and the steel nothing, to the detail. The constructive forms of the past have been continued in use, as well as the decorative motives, whether they have been suited to the material in which they are wrought or not.

Sixteen-story buildings have sought to avoid the appearance of height by adopting some manner of design by which their real altitude could be partially concealed. Breadth and comparative lowness have become such desirable qualities, in our minds, that we have been willing to make that seem low which was not low, and solidity and repose have been so desirable, that we have sought to supply the appearance of these qualities to buildings where the whole purpose was in the opposite direction. But, it has become evident to the intelligent designer that we must stop trying to make a twelve-story building look like a distorted Greek temple, and must stop trying to use forms which must be distorted in their proportions in order to fit requirements at variance with any which such forms can properly answer. The fact is that the problem of a design in steel and plate-glass for a tall building is a new one, and it cannot be solved by the old rules. There is no use trying to convince ourselves, or anybody else, that the little piers laid up with brick are the real piers; we see at a glance they are not. They would be crushed instantly if they were. There is no use trying to lead anybody into the idea that a brick or stone wall can be laid across a twenty-foot void, with nothing to support it. There is no use trying to conceal the fact that what we see is only a covering of the real building material, on whose efficiency the structure depends. There is no use trying to hold longer to the antiquated notion that only comparatively low buildings are architecturally creditable. There is no use, either, of our entertaining the idea that because steel cannot be successfully used in proportions suitable to stone, that, therefore, steel is not a good material for architectural purposes.

The fact is that the wall and pier and buttress, hitherto the strength and support of the building, have no reason for an existence under the new conditions. It is, therefore, possible to conventionalize them as the Greeks did the wooden cornice when they built in marble, or it is possible to omit them altogether as features of the design, as the builders of the Middle Ages did with the entablature, when they had no further use for it.

There seem to be four parts to be disposed of in the design for a modern steel building: First, the continuous posts; second, the lintels between stories; third, the panel of brick or other material which fills the space between posts and lintels; and fourth, the windows. It seems to me that while the steel must be concealed from the elements, it should not be concealed in the design, and that the surface of the building should take the form of a covering of continuous posts, and a covering of horizontal members between posts, and the filling-in of the panels which intervene. It would seem, also, that neither of these three should be so designed as to make believe that it is the support of the structure, but the covering of posts and lintels should show that it is a covering, and a covering only, of that which is the support of all. It would seem, furthermore, that this screen and covering should take on its true character, and appear to be what it really is, and not pretend to be a wall.

The reflex influence of this change from the old ideas in the design of buildings where steel is really used, will be a tendency to harmonize the design of other buildings to express an architectural relationship with them.

Thus, we have the influence of steel construction and plate-glass: first, the tendency to greatness, especially in the direction of greater altitude and greater dimensions for interiors; second, a tendency toward angularity of style; third, a tendency to better illumination; fourth, a tendency to decrease ponderosity of structure; fifth, a tendency to entire reformation in the use of forms and motives of ornaments.

In accepting — as I think we must accept — radically new ideas of architectural propriety and fitness, we do not — must not — lose sight of the principles upon which all architectural art is founded, without reference to the style in which the expression is made.

In architectural design the elements are few — the combination infinite. Line, volume, texture, light, color — these are the notes which compose all the wonderful harmonies in the world's architecture, by variation, combination and organization. Each element has its own language, — its own influence in the picture, — its own way of affecting the sensibilities, according to its own unvarying law. The aggregated sensation is an emotional resource which we call feeling. The designer may play upon these notes like one who sings a song by air, knowing nothing of the science of music. He may not even think why any element of his design produces a given effect. He may not even know that it does, but a master of design must be a master of its elements, as a great artist must know the nature and effect of each pigment he uses, and a musician must understand the scales which are the basis of all musical composition.

If in a building we desire an effect of dignity or of frivolity, of severity or grace, of boldness or delicacy, of rudeness or refinement, we must make use of those combinations of elements which will produce the desired result. A design with equal lines — be they ever so long, equal volumes — be they ever so large, colors in equal key — be they ever so rich, is only confusion and weakness. It has the evenness of death, no expression, and is devoid of feeling. In the ideal design, the longest lines must be assisted by shorter lines grading down to the shortest that will distinctly reach the eye. The great volumes must be judiciously contrasted with volumes less and still smaller in size, until they reach the minimum that the eye can readily distinguish. The cube must vary to the line in one direction and to the sphere in the other. The color must vary in key to produce a balance between extreme intensity and the lowest key definable to the eye. These elements, properly marshalled and proportioned, are nature's contribution to the design. But all these when carefully balanced, until the sharpest criticism fails to find a point of attack, only produce a result like a beautiful organism ready for action, but awaiting the breath of life. That which must make this image of beauty a living reality, that which must animate and vitalize it, is the human element in the picture — the spirit of the designer who speaks life into the dead clay, or steel, or stone, and gives it a voice to join in the song that through the greatest of the arts creation sings for man.



THE SOCIETY OF BEAUX-ARTS ARCHITECTS: COMPETITION NO. 7.

THE Committee on Education has to report that the judgment of the last exhibition of drawings entered in competition was held on October 27th. The Jury was composed as follows: Mr. E. L. Masqueray, Mr. John G. Howard, Mr. E. P. Casey, Mr. A. A. Stoughton, Mr. E. A. Josselyn, Mr. Ernest Flagg and Mr. John M. Carrère.

The awards were as follows:

CLASS A, PROGRAMME. — A PUBLIC MORTUARY CHAPEL IN A LARGE CEMETERY.

First Mention. — Will C. Haskel, pupil of Mr. E. L. Masqueray. Herbert Van Vlack, San Francisco. Robert D. Graham, pupil of Mr. Ernest Flagg.

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Second Mention. — Unanimously voted to A. H. Wright, Boston. Arthur L. Nicholson, E. A. Isles, Adolph Mertin and Jas. Hopkins, pupils of Mr. E. L. Masqueray. T. R. Johnson, pupil of Mr. Ernest Flagg. S. P. Hobart, pupil of Howard & Caldwell.

Third Mention. — J. W. Clich, Jr., John A. Robb, John R. Jordan, Chas. H. Darsh and S. S. McGrath, pupils of Mr. E. L. Masqueray. C. L. Brinsmade and G. Edward Escher, pupils of Mr. Ernest Flagg.

CLASS B, PROGRAMME. — A FERRY-HOUSE IN NEW YORK CITY.

Medal was awarded to E. R. Bossange, pupil of Mr. E. L. Masqueray.

First Mention. — Wm. T. L. Armstrong, pupil of Mr. Masqueray.

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

ENTRANCE TO NEW YORK LIFE INSURANCE COMPANY'S BUILDING, MINNEAPOLIS, MINN. MESSRS. BABB, COOK & WILLARD, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print, issued with the International and Imperial Editions only.]

ENGINE-HOUSE AND BATTALION HEADQUARTERS, ELM AND WHITE STREETS, NEW YORK, N. Y. MESSRS. N. LE BRUN & SONS, ARCHITECTS, NEW YORK, N. Y.

THIS building, of which the fronts are of limestone and cream-colored brick, contains two engines and a water-tower; it is, besides, the fuel depot for the district and contains the Battalion headquarters. Realizing how important a thoroughfare Elm Street is to become after the projected widening has taken place, the authorities and their architects have acted wisely in erecting a building which will give so high a tone to the new buildings that are to postdate it.

DETAILS OF THE SAME.

THE SAYER HOUSE, NEWPORT, R. I. MEASURED AND DRAWN BY MR. P. G. GULBRANSON, BOSTON, MASS.

OTHER details of this house may be found amongst the advertising pages.

[The following named illustrations may be found by reference to our advertising pages.]

PALAZZO FARNESE, CAPRAROLA, ITALY: PAINTINGS BY TEMPESTI, IN THE LOGGIA OF THE MAIN STORY.

THE SAYER HOUSE, NEWPORT, R. I.: TWO PLATES. MEASURED AND DRAWN BY MR. P. G. GULBRANSON, BOSTON, MASS.

NO. 27 CHURCH STREET, NEWPORT, R. I. MEASURED AND DRAWN BY MR. P. G. GULBRANSON, BOSTON, MASS.

A GROUP OF DOORWAYS.

[Additional Illustrations in the International Edition.]

NATIONAL SHOE AND LEATHER BANK BUILDING, BROADWAY AND CHAMBERS STREET, NEW YORK, N. Y. MESSRS. J. C. CADY & CO., ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

DESIGN FOR A HÔTEL DE VILLE. MM. E. DUPONT & GUILBERT, ARCHITECTS.

[Copper-plate Engraving.]

THE CHURCH HOUSE, WESTMINSTER, LONDON, ENG. SIR A. W. BLOMFIELD, ARCHITECT.

INTERIOR OF THE SAME.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

"CAST-IRON *VS.* STEEL COLUMNS."

NEW YORK, N. Y., October 31, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Replying to your correspondent "*X*" in current issue of your valuable journal, I wish to state that the best practice with reference to high buildings seems to favor the use of steel columns in preference to cast-iron, and for these reasons: —

First. — Cast-iron has been known to be in a state of unequal tension due to many causes, thus favoring sudden collapse. Cast-iron column connections are generally *bolted;* instances are known where the story of a building has passed inspection and to save time in going for other bolts, the ones in place have been removed to be used in the advanced construction. Steel column connections are made with rivets.

Secondly. — A cast column is bulky, and from its mere bulk may conceal radical defects undiscovered by the hammer. A steel column is assembled from small and easily inspected and tested members, which are riveted together and become a solid integer; this can not be done with cast-iron.

A building twelve stories high must be fireproof or, at least, consist of fire-resisting construction.

"An essential feature in fire-resisting construction" (and therefore of strong and *safe* buildings) "is an iron or steel frame with such well-designed joints and connections that they will not part with nor lose the larger portion of their sustaining power, even though much softened and twisted."

No buildings in which *cast-iron* columns or *bolt* connections are employed can have this characteristic of good iron or steel construction.

Most of the buildings constructed of considerable height are, or should be, planned like a bridge, with one end fixed. Bridge engineers now make but little use of cast-iron.

The one argument advanced against the use of wrought metal as compared with cast is that the former rusts more. I believe that skilled constructors can and do protect wrought metal so that it will last as long as, if not longer than, cast-iron. I should strongly urge "*X*" to use wrought metal in his twelve-story building.

GEORGE MARTIN HUSS.

PHILADELPHIA, November 3, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In reply to "*X's*" question, in your issue of October 31, 1896: "In the skeleton construction of a twelve-story building, which is best to use, cast-iron or steel columns?" I am minded to express my own thoughts upon this question.

"*X's*" query is such a broad one that it is difficult to answer it intelligibly.

It is presumed that, by "steel" he means rolled steel containing a small percentage of carbon.

Those who have followed the course of building construction for the last fifteen years are amazed, when they reflect upon the great and rapid changes in methods which have taken place during that period.

When, in former times, the outer walls of masonry were expected to support not only themselves, but also a part, at least, of the floor and roof loads, and when the heights of buildings were small as compared with their areas upon the ground, there was scarcely a question as to what was the best material to use for interior columns; the use of cast-iron was almost universal, except perhaps in mills and factories, where the question of cost decided in favor of wood.

When, however, it became necessary to erect high buildings upon relatively small areas of very expensive ground, and ground that was soft and treacherous at that, then, the constructive method to be pursued became a matter of the utmost importance. The static weights must be reduced to the utmost, because of the inability of the ground to sustain great weights without undue settlement; at the same time the walls must be thin, and the piers and columns small in area, so that the rentable space should be as large as possible.

To fulfil these conditions the skeleton system of construction was devised. Such interest was manifested by architects and engineers in the new method of construction, that it has been rapidly developed to a high degree of efficiency, and has resulted in the development of a distinct branch of the engineering profession at the present time.

Almost all the rolling-mills of importance are now organized for the production of structural work for buildings, so that rolled and riveted work can be erected very cheaply: this fact alone is often an important one in deciding the character of the construction.

With the foregoing remarks in mind, the following observations

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may be useful to "*X*" in determining the kind of column best suited for his building:

I have purposely omitted the question of fireproofing, as it can be applied to cast or rolled columns with equal facility.

In the abstract, it may be said in favor of rolled columns that they can usually be made so as to occupy less floor-space than cast ones, because of the smaller factor-of-safety used.

They offer superior facilities for girder and beam connections.

They are less liable to contain dangerous defects.

They are much lighter in weight, thus keeping down the first cost, as well as the cost of transportation, handling and erection.

They can be made in greater lengths than cast columns with less liability of being crooked.

In a similar manner, it may be said in favor of cast columns, that they can be procured at almost any foundry, a comparatively small and inexpensive plant being required for their manufacture.

If they are carefully designed, with all their parts of the same thickness, and without abrupt change of shape, and are cooled in the sand slowly and evenly, they will behave well in service, as the great number of them in successful use will testify.

They are less liable to dangerous corrosion or rust than rolled columns.

Small columns or struts, shoes, etc., are more easily and cheaply made of cast-iron, and may be of more pleasing shape.

If "*X's*" twelve-story building has a large area in proportion to its height, and the ground upon which it stands is capable of sustaining a pressure of 8,000 pounds per square foot without undue settlement, then there is little to say against the use of cast-iron columns.

On the other hand, if the building in question is of small area, or, if the ground is treacherous, so that he must keep his building as light in weight as possible, he will be obliged to use a full skeleton of rolled metal, with outer or "curtain-walls" of terra-cotta or hollow bricks.

If this latter supposition is the case, then the columns should be as long as possible, extending through several stories without a joint, and all column joints should be spliced sufficiently strong to transmit the full column loads: all connections should be riveted.

It may be necessary to take special precautions against the effect of the wind, depending upon how much of the structure is exposed above adjoining buildings, its shape and area upon the ground, and its weight, as opposed to the force of the wind; which may tend, (*a*) to unduly load the leeward columns, (*b*) change the shape of the frame, which will produce cracks and rifts in the plaster, (*c*) produce overturning.

I realize clearly that, while good practice at the present time favors the rolled column, yet, it is not unlikely that the calamitous failure of a rolled frame would produce a revulsion of sentiment toward cast metal. Little has been heard of the possibilities of cast-steel for columns.

Very respectfully,

Charles L. Hillman.

THE ARCHITECT'S PAYMENTS.

Brooklyn, N. Y., November 4, 1896.

To the Editors of the American Architect: —

Dear Sirs, — A society in this city, building a hospital, elects a building-committee, of which I am chairman. A competition among architects takes place; among the many stipulations is this, "*the successful architect shall be the architect of the building and receive a compensation for his services of 5% of the cost of the building.*" After contracts with builders were made, a verbal contract was entered with the architect that he be paid 2½% of the cost at the signing of contract with the builders, and 2½% of each of the successive payments made to the builders.

The Committee is blamed for having made such a contract, *as it was common practice to pay architects at the completion of the work.*

Is not the architect entitled to a further payment of 1%, he having completed all the details required?

I know of no better authority than you, and will thank you for an early reply.

Yours truly, Carl F. Eisenach.

[The "verbal contract" made with the architect conforms to the usual practice of the profession. To be sure, the schedule of charges of the A. I. A. declares the "architect's payments are successively due as the work is completed in the order of the above classifications." From this it would follow that on completion and delivery of "general drawings, specifications and details" the architect could collect 3 1-2 per cent. But it is so seldom that *all* detail drawings are finished at the time of signing a contract, that it has become the custom to collect the last half of the commission as successive percentages on payments to the builder. — Eds. American Architect.]

NOTES AND CLIPPINGS

Democratic Slaps at Royalty. — Talking about Brussels reminds me that the King of Belgium has just been subjected to a very unpleasant mark of dislike and hostility on the part of one of the wealthiest and most influential of his subjects, a millionaire of the name of M. Van Der Driesche. Some time ago this gentleman bought a plot of ground in front of Leopold's villa in the Avenue de la Reine, at Ostend, and built thereupon an elegant residence, which much interfered with his Majesty's view. The King caused this fact to be intimated to M. Van Der Driesche. The latter at once pulled down his villa, but has since erected on the site a monster hotel, twelve stories high, a regular sky-scraper in fact, which entirely closes off his Majesty's view and renders the royal villa to all intents and purposes uninhabitable. Curiously enough, the action of the millionaire is meeting with universal approval in Belgium, and even at Ostend, a fact which goes to show the extent to which King Leopold has managed to forfeit the good will of his subjects.

The Emperor of Austria has been driven by the force of public opinion to confer the grand cross of the Order of Francis Joseph upon Baron Nathaniel Rothschild. In the patent conceding the order it is stated that it is by way of recognition of the Baron's munificence in giving his castle and park of Reichenau for use as a home and asylum for invalid and discharged soldiers. But if the Emperor had had his way he would never have granted the honor, seeing that the Baron's abandonment of his château to charitable purposes was merely dictated by spite against members of the imperial family. Some fifteen or twenty years ago the Emperor's brother, Archduke Charles Louis, enchanted with the beauty of the scenery of Reichenau, purchased a large tract of land, built a château for himself and made it his summer home. Forever vaunting the beauties of the place, a number of his imperial relatives, as well as a large contingent of the oldest Austrian aristocracy, were induced thereby to build villas and châteaux in the neighborhood, until at length Reichenau became known as the most exclusive and select of summer resorts. His breast filled with social aspirations, Baron Nathaniel Rothschild came to the conclusion that he might further his ambitions in this direction by buying a property in the neighborhood. This he succeeded in doing by dint of strategy, and before long aristocratic and imperial residents at Reichenau were horrified to perceive that the turrets and battlements of an exceedingly pretentious and by no means picturesque or artistic modern mediæval castle were rising above the trees, vulgarizing one of the most beautiful and conspicuous spots in the valley. As soon as the castle was completed, the Baron established himself there and proceeded to call upon all his titled neighbors, who, acting in deference to the suggestion of Archduke Charles Louis, declined to take any notice of him whatsoever. In fact, the Baron was slighted in every possible way, being even refused tickets to local charitable entertainments to which the very peasants were asked. Moreover, the rights of way accorded to the other residents of the place were denied to him. After a bitter struggle he at length was compelled to abandon the attempt to force his way into Reichenau society and to confess that he had been frozen out. Determined, however, to have the last say and to get even with his enemies, he announced his intention of presenting his château and his estate for the use as an annex of the great cancer hospital at Vienna. Fortunately for the residents, the Archduke's influence was successful in having the gift declined by the managers of the hospital in question, and finding that owing to their dependence upon imperial and aristocratic patronage most of the metropolitan hospitals would show a similar reluctance to take advantage of any offer that he might make, the Baron finally announced he would give the place to the Government for use as an asylum for old soldiers. This time the offer had to be accepted, the Baron having happened to make it just at the moment when the authorities were confessing their inability to provide in a satisfactory manner for military veterans. Reichenau is now thronged with old soldiers, much to the annoyance of the residents, who, however, reflect that it might have been worse and that after all, the veterans are infinitely more picturesque to gaze upon than the inmates of the great Viennese cancer hospital. — *Marquise de Fontenoy.*

Vehement Criticism. — There is a rude force shown by these Englishmen that often compels admiration. Take architecture, for instance. If an old Bostonian objects to some general design or feature of detail, he writes a letter to a newspaper, and in filing and polishing sentences works off his anger. Or he and other estimable gentlemen descend from their family trees for the purpose of draughting resolutions of protest which they sign with the awful dignity of names in full. But in Frognal the other day, an Englishman of very ancient family, one Adam Parent — somehow the name seems tautological — discovered in a walk abroad suburban houses that displeased him mightily. Mr. Parent is fond of architecture. Men say he can recite with only a few immaterial omissions the whole of the first and famous chapter of Vitruvius, and the greater part of Claude Parrault's preface to the translation dedicated to the Grand Monarch. How did Mr. Parent show his artistic horror and contempt? By spluttering in a letter to the *Times*? By going to the nearest "pub"? The enthusiast bethought him of Samson's last professional appearance, and then he walked up Frognal pushing at the brick-and-plaster capitals of the entrance piers of the houses; and these miserable objects either fell out and were broken, or else shifted out of position. As a commentator remarks, "No more impressive rebuke could have been administered to the taste which selected and the workmanship which inserted these curious parodies of Classical style." — *Boston Herald.*

Do Telephone Wires mitigate Lightning Strokes? — It has long been held from practical experience that the network of wires now found in many towns protects those places from the effects of lightning, and probably also prevents many thunderstorms from breaking over them. An official inquiry has been recently made in Germany as to the influence exerted by telephone wires on atmospheric electricity, with a view to set at rest the question whether danger from lightning stroke is increased or diminished by a close network of wires. The inquiry has shown that the wires tend to weaken the violence and diminish the danger of lightning stroke. Returns obtained from three hundred and forty towns provided, and from five hundred and sixty not provided, with a telephone system, show that the danger varies in the proportion of 1 to 4.6 between the two cases. — *Invention.*

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THE Boston *Herald* has taken up the cue given by the English newspapers, and, in a long editorial, informs its readers that "it is becoming a common thing in England for engineers who are employed to lay out and supervise work, and for architects who plan and superintend the construction of buildings, to demand and to receive commissions from those who contract to do work or furnish supplies"; and it thinks that "in all probability methods of this kind obtain to quite an extent in this country." In view of these considerations, it wishes to know whether "something cannot be done, through the instrumentality of an aroused public opinion, in putting a stop to those forms of fraud which consist in the payment and collection of commissions in the carrying on of contract work." We can answer this question at once, so far as architects are concerned, by saying that something can easily be done, without waiting for "an aroused public opinion," which will be perfectly effectual, and that is to find a single authentic instance of the demand or acceptance by an architect of any commission, bribe, gratuity or favor whatever from any contractor, and call the attention of the owner to the matter, specifying the evidence, so that he can recover the amount out of which he has been defrauded, or lay the case before the grand jury, as may seem to him most judicious. Within the last three months this country has seen enough, and more than enough, of the dissemination of wholesale slanders, based simply on assertion, without a shadow of evidence to support it, and the *Herald* seems to have caught the fever. It is hardly necessary to say that the circulation of such reports is extremely injurious to the professions which are entrusted with greater discretion, in regard to the expenditure of larger sums of money, than any other, and is indirectly injurious to the public, by attacking the confidence which should exist between professional advisers and their clients.

THE truth of the matter of illicit commissions to architects is that while a few predatory individuals, political "heelers" and the like, who are architects only in name, together with a still smaller number of persons who have some professional knowledge, but have been "unclassed," as a Frenchman would say, by drink or vice, undoubtedly take advantage of the great opportunity for fraud which the charge of building operations offers, and fill their pockets at the expense of those who trust them, the great mass of the profession would as soon think of robbing their employers on the highway as of taking their money indirectly by means of percentages from the contractor. That percentages, bribes, commissions, or whatever they may be called, are often offered, is true enough, but we imagine that they are offered still more commonly to other people who are supposed to control the expenditure of money. Some years ago, after being asked by a contractor, who was making up an estimate, how much was to be our share, we had the curiosity to inquire what sort of people he found willing to accept percentages of the sort. He acknowledged that very few architects were open to such proposals, but said that a good many other people had to get a share out of the amount of contracts over which they had some control; and he mentioned a lawyer, the trustee for a large estate, who, as he said, "had to get something" out of every purchase or contract made on behalf of the estate. Of course, it is no answer to a charge against one profession to throw mud at another, and we can truly say that we believe such breaches of trust to be as rare among lawyers as they are among architects, but the court reports show that they occasionally occur. Such cases as are discovered are usually confined, however, to lawyers of a class corresponding to the sort of architects who are guilty of similar acts, and the injustice is in attributing to a whole profession the acts of a few.

SO far as our experience goes, the tendency to unfaithfulness among architects, instead of increasing, as the *Herald* fears, is in this country diminishing. Twenty-five or thirty years ago, a certain amount of architectural work was done by men with neither mental nor moral equipment for their duties, and their idea of honorable conduct was the same as that of the grooms and butlers and janitors with whom they were naturally associated. Now, however, nearly all those who practise architecture are men of education and social position, who, even if their nicer sense of honor would permit a breach of trust, have too much to lose to expose themselves to detection, while the rules of all the great professional societies pledge their members in the most solemn manner to avoid, under pain of immediate and disgraceful expulsion, all acceptance of bribes or favors, direct or indirect, from contractors.

A DISCUSSION is going on between the "Greater New York" Commission and the officials of the Building Departments of New York and Brooklyn, as to the best way of administering the affairs belonging to such a department for the united municipality created by the new statute. Mr. Constable has already made it quite evident that he considers his present duties sufficient to occupy all his time, and Mr. Bush, the Building Commissioner of Brooklyn, says, to the same effect, that it would be impossible to have the work now done at his office in Brooklyn carried on at an office in New York. He suggests, very sensibly, that it might be best to divide the metropolitan city into boroughs, putting into the hands of a commissioner for each borough the duties now devolving on the various Superintendents of Buildings, and to make the central office, in New York, a place for the decision of appeals from their ruling, and the exercise in other ways of that superior discretionary authority now vested, in New York, in the Board of Examiners. There is no doubt of the wisdom of this opinion, but it seems as if advantage might be taken of the changes which will soon be necessary, to modify the existing system by the appointment of District Surveyors, charged with the duty of examining plans for buildings in their districts, after the method which has been found so successful and convenient in London. The weak point in the official supervision of building work in our cities has always been the criticism of plans. The more thoroughly and conscientiously the official in charge of this duty does his work, the louder are the complaints of delay; and unless the examining force is large, such complaints at certain seasons must be well founded. Under the London system, the District Surveyor, who is always an architect or engineer, has to do only with a limited territory, which he soon comes to know thoroughly, and is therefore well fitted to advise and criticise in regard to foundations, or similar points. His territory being small, he has not many plans to examine, and can

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study them promptly and efficiently, and, after the drawings have been stamped with his approval, he can, if desirable, safely leave the supervision of their execution to the regular inspectors of building work. In London, many of the District Surveyors are practising architects, who give only a small portion of their time to their official duties; and, as they are paid by fees, fixed by law, the cost of maintaining them does not fall on the public purse. Whether this system would be altogether applicable to New York and Brooklyn it is, of course, impossible to say, but there can be no doubt of the importance and economy of putting the examination of plans for buildings in the different portions of the two cities in the hands of men familiar with the conditions of each portion, and sufficiently at leisure to make their examination and report within a few hours, rather than after months of delay.

IF the Boston Art Commission have made themselves a consenting party to the temporary placing of the "Bacchante" in the court-yard of the Public Library, with a view to the reconsideration of their vote of declination after seeing the statue itself *in situ*, we feel they have made a grievous mistake, and have established a precedent which will rise up to plague them through long years. During the term of their existence, the Boston Art Commission have declined a greater number of offerings than is suspected by the public, and in almost every case their decision has been reached through the aid of such data as were laid before them in this latest case. If a precedent shall be now established that a would-be Macenas can demand that his offering shall not be declined until it has been set in place and submitted to the popular verdict, away goes all the power of the Art Commission and they may as well resign their offices. Every possible site in the city will be preëmpted by schemers and their claims will be protected from jumpers by all the devices known to law. The Cogswell Fountain and the "General Cass" afford bitter proof of how difficult it is to displace a piece of work that is unfit and inartistic. As we anticipated, the newspapers outside of Boston, and many correspondents writing from Boston, have assumed that the decision turns on a question of nakedness, whereas that is an altogether minor consideration. Architects, who assume to be artists, in these days maintain that the sculpture associated with their buildings should not only be in character with the architecture, but especially designed for the particular site it is to occupy. It is impossible to believe that any man with a sense of the fitness of things could give a commission for a naked tipsy girl, thinking to provide a piece of sculpture suitable for a building that of all buildings, the church excepted, is most sedate and quiet in character. The whole affair irresistibly suggests the "job lot" and the "misfit parlor."

IN the loss of Mr. William Henry White, the Secretary of the Royal Institute of British Architects, the profession all over the world, as well as in England, has suffered an appreciable loss. For eighteen years Mr. White, as the official representative of the Institute, has maintained the most friendly relations between it and other professional bodies, remembering always the dignity of the principal architectural society in Great Britain, perhaps in the world, at the same time that he won the regard of the profession everywhere by the warm interest which he took in all matters of professional concern, and the courtesy and tact with which this interest was shown. Mr. White, before giving up active practice to undertake the duties of the Secretaryship, had had an unusually varied professional experience. Although born and brought up in England, circumstances led to his settling in France in the earlier part of his career, and he executed there some important works of construction or restoration. At the outbreak of the Franco-Prussian War, he went to Calcutta, in the service of the Public Works Department of the Indian Government, and remained there three years. Returning then to London, he was employed as Examiner in Architecture in the Indian Engineering College, and wrote for the professional journals, besides practising as opportunity offered. Not long afterwards, on the appointment of Sir Charles Eastlake to the office of Keeper of the National Gallery, Mr. White was chosen to succeed him as Secretary of the Institute, and had since then devoted all his time to the work of this important position.

WE feel ourselves impelled to call attention again to the desirability of adopting in this country the German system, by which subscriptions are received at all post-offices for any periodical published in the Empire. Publishers have not been particularly prosperous in this country of late years, and an arrangement which would cost them nothing, and would, as it seems to us, immensely increase their income, ought to be worth advocating, in their interest, as well as in that of the public. Most people begin their subscription to a periodical in consequence of having been attracted by a chance number, or by some article in a number, which excites in them the impulse to subscribe at once. In at least nine cases out of ten, however, the would-be subscriber forgets to take note of the name or address of the publisher, or of the price of subscription, or waits until a more convenient time for going through the tedious ceremony of getting a postal order, or a registered letter; the impulse dies away, and he forgets all about the matter. If here, as in Germany, a printed list were hung up in every post-office, with the names and subscription price of all newspapers and periodicals, or, at least, of all of general interest, and every postmaster could be authorized to receive the subscription price, with as little delay and formality as possible, and see to the delivery of the publication until the subscription expired, we believe that the greater part of our periodicals of real value would double their subscription list at once, and hundreds of others, such as scientific publications, which have only a limited circulation, would benefit still more, for the simple reason that their existence would be made known to a large number of persons, more or less interested in the subject, who are now entirely unaware of their existence. To take a single example, there is, or was, we believe, a little periodical called *Papilio*, or something of the kind, devoted to natural history of the entomological sort. It may safely be presumed that the circulation of this magazine has never reached one hundredth part of the number of people, boys and girls, as well as older people, who take an intelligent interest in butterflies, and know a good deal about them, and would like to know more, mainly for the reason that very few of these persons ever heard, or are ever likely to hear, of its existence. As for the parents of the boys and girls who take so much pleasure in their little collections of North American insects, it is safe to say that thousands would like nothing better than to make their dear children a Christmas present of a subscription to just such a journal, and would do so if it were put into their heads. If the fact of its existence, and its price, were noted at the post-office, the young naturalists, at least, would soon call the attention of their parents to the circumstance, and three people, including the butterfly-hunter, his papa and the publisher, would be made happy, where now all lack something to perfect contentment. We do not say that the Post-office Department ought at once to make itself agent for all the publishers of periodicals in the country, but there could be no great difficulty or expense in permitting, perhaps, an informal publishers' association to keep a list of the kind in all post-offices, and in authorizing postmasters to take subscriptions, possibly in return for a small commission, to be divided between the postmaster and the Treasury.

THE election of Mr. E. J. Poynter to the Presidency of the English Royal Academy, to succeed Sir John Millais, does not seem to please all the critics. Harold Frederic, who is not always diplomatic in his accounts of people, writes that "considered as an artist, Poynter is not quite the worst in the Academy," but he thinks that Rivière ought to have been chosen. Another correspondent of the American newspapers accuses Mr. Poynter of belonging to the "South Kensington gang," and says that his election was due to the efforts of the Princess Louise, who was one of his pupils, and that the artistic world would have been much better pleased with the choice of Alma Tadema, or Val Prinsep. While all these strictures may have some foundation, it is probable that the members of the Royal Academy may have been quite aware of what they were about in casting their ballots for Mr. Poynter, and if they wanted him for their President, it is not clear why the public should feel called upon to interfere. While it is for the interest of the Royal Academy, as well as of art, to have an artist of high reputation at its head, it must be remembered that the President of the Academy has serious duties to perform, and tact and discretion may be more necessary, in dealing with a body of artists, than newspaper repute.

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STABLES. — II.[1]

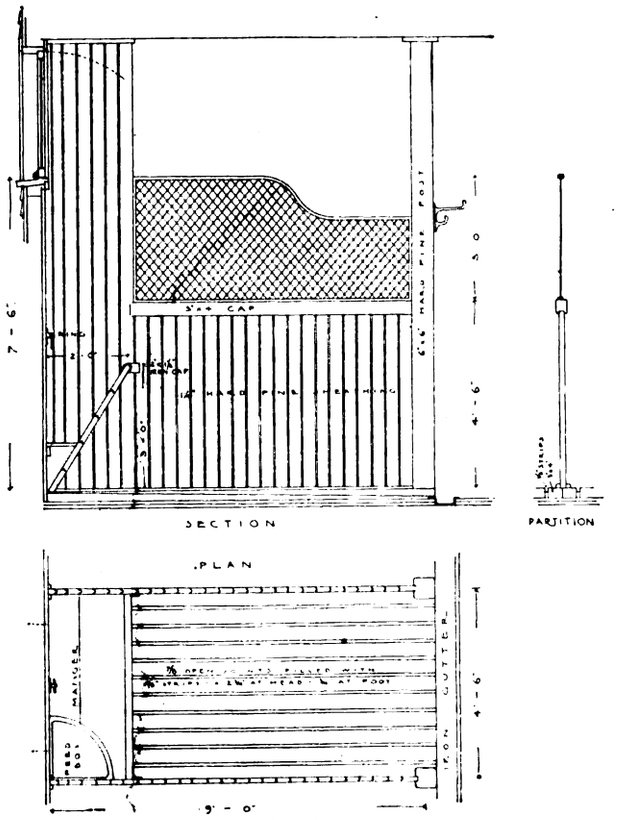


Fig. 3. Stall Construction.

STALL-ROOM. — Usually in planning a stable the stall-room is the first portion to arrange for, as the number of stalls is a measure of one dimension of the stable. The stall-room should be entered from the carriage-room as close by the trough as possible, being separated from the carriage-room by a sliding-door which will fit tight when closed. If there is a cellar under the stable, the entire floor throughout should be of waterproof construction following one of the methods hereafter described. If the stable is small, however, and there is no cellar underneath, it is not customary to make any special attempt at waterproofing any farther than is incidental to arranging the stalls so that the liquids will be properly conducted to the gutter. It is a very good plan to have the upper or wearing floor in the stall-room of $1\frac{1}{4}$" square-edged plank, either spruce or hard pine. A $\frac{7}{8}$" floor will wear just about as well, but has to be renewed more frequently.

It is customary to arrange the stalls in a continuous row on the side of the stall-room, opposite the entrance, with a passage not less than 6 feet wide, and better 8 or 10, across the back. This passage should lead directly to the outside of the stable, with a sliding-door giving access to the paddock, and on the side wall of the stable away from the stalls should be arranged the chutes connecting with the grain-bins in loft. These chutes are best made of galvanized-iron in the same form that is customary for use as conductors, and provided with a valve at the bottom by which the flow of grain can be regulated. In the centre of the length of the passage, hooks and hitching-straps should be arranged on each side to hold the horse's head while he is being groomed. On the side wall, or in the most convenient place near the door from carriage-room, should be a triple set of blanket-bars, and close by the location for grooming the horses there should be a sponge-rack and a shelf not less than 3 feet long and 9 inches deep for holding implements. It is well, also, to have in this part of the stable a medicine-chest, arranged with a drawer at the bottom about 3 inches deep and two or three shelves from 6 inches to 15 inches apart to allow for different sizes of bottles, the cupboard being enclosed by a panelled door and not less than 4 inches deep inside.

It is not considered advisable to introduce any artificial heat into the stall-room, upon the theory that the natural heat from the horses is sufficient for their well-being and that any artificial heat would tend to make them susceptible to cold when taken out of doors. Arrangement for ventilation is usually made by carrying from the ceiling of the stall-room a shaft about 200 square inches in area, up to a central ventilator placed on the main roof. This is not essential if proper opportunities are afforded for ventilating by means of windows placed high up towards the ceiling of the stall-room. There should be one such window at the head of each stall, hinged at the bottom to swing down, the top being kept close to the ceiling, if possible, and the bottom being not less than 7′ 6″ above the floor. These windows should not be of less than 5 square feet area each and should be operated by cords led across to the posts at the rear of the stalls. Wire guards are often placed over the glass, with the idea of preventing the horses from breaking it. It would, however, be better to elevate the windows a little more from the floor, as the wire-work collects dirt very quickly. For artificial light, a single gas-bracket close by the medicine-chest is all that is required.

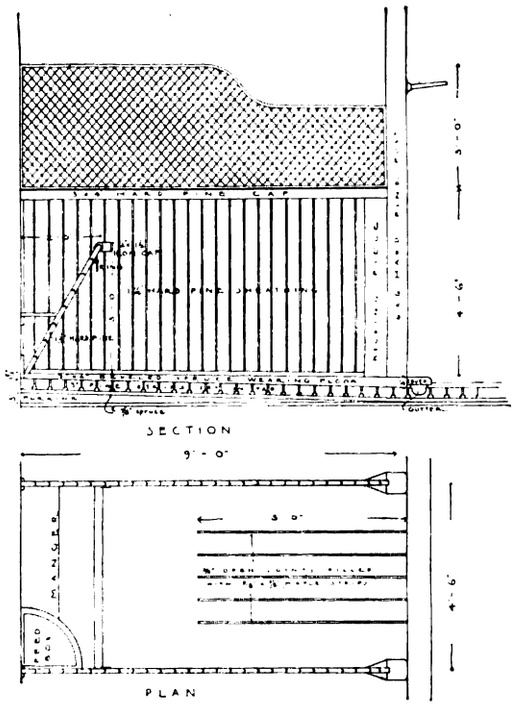


Fig. 4.

The stalls naturally require more care than any other feature of a stable. These are usually made 9 feet long from the head of the manger to the post at the rear, and in width they vary from as narrow as a little over 3 feet in some of the crowded city stables where horses are kept for sale, to a width of 5 feet, box-stalls being made generally the square of the length of the other stalls.

A single stall more than 5 feet wide is not advisable, as a horse is very apt to become stalled therein and rendered perfectly helpless. A good width is 4′ 6″, though experience in large boarding-stables shows that 4 feet will answer, if the conditions require it.

As usually arranged, the stalls can be entered only from the back, the manger being placed against the outside wall of the stall-room. Where space will permit or where the extra incidental cost is not prohibitory, it is a very excellent idea to have the stalls entirely distinct from the outside walls, so that the attendant can get at the head

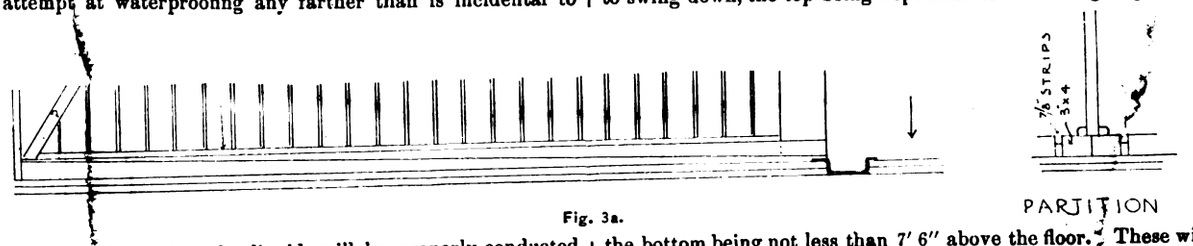


Fig. 3a.

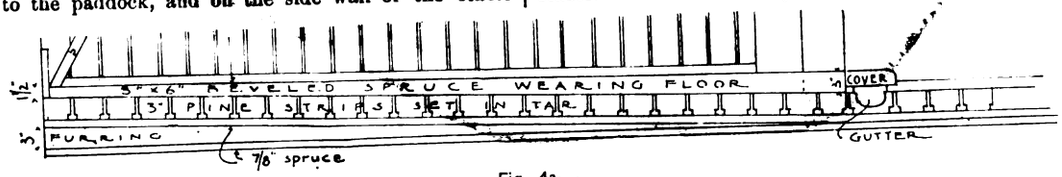


Fig. 4a.

[1] Continued from No. 1085, page 12.

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of the stalls without going into them beside the horse. A passage 3 feet wide, separating the head of the stall from the outside wall is ample for this purpose. Stables are, however, seldom built in this manner, as it increases the size of the building very materially and is a matter of luxury rather than necessity.

Stall-fittings are manufactured in stock by several different concerns, all of them being studied out in detail in a very satisfactory manner. The difference between various manufactures is in detail or in nicety of fittings, such as brass caps to posts, fancy guards, elaborate patented mangers, etc. Only the general arrangement need be considered in this connection.

Figure 3 shows one of the simplest arrangements of stall. The posts are of 6″ x 6″ hard pine, rounded on the corners, carried from floor to ceiling and securely fastened at each end. The entire stall-room floor is boarded with an upper and under floor, the upper floor being matched. Over this, in the space to be occupied by the stalls, is a floor of planed 3″ x 4″ spruce, cut square and in continuous lengths from end to end of the stall. A shallow iron gutter is set with its top on a level with the bottom of this 3″ x 4″ flooring with the lip carried under the woodwork. The gutter is given as slight a pitch as necessary to throw the water off. The gutter is 2 inches deep and rests directly on the timbers or is cut slightly into them to secure the necessary pitch. The 3″ x 4″ pieces are laid $\frac{7}{8}$″ apart and the joint is filled with a $\frac{7}{8}$″ strip of maple, so as to be 3 inches high at the head of the stall and, at the most, $\frac{1}{2}$″ high at the back over the gutter. All of this top flooring is laid in, and the joints filled with, hot tar. The stall partitions are laid on top of the 3″ x 4″ floorings and consist of $1\frac{1}{4}$″ matched hard-pine vertical sheathing, secured at the bottom by a small cleat on each side and grooved into a 3″ x 4″ hard-pine cap on top. For a space 2 feet wide by the head of each stall, this sheathing is carried to the ceiling and the space over the partition cap, between the head and the stall-post, is filled-in with a grating of $\frac{1}{4}$″ wire, with 2″ mesh, carried to a height of 3 feet above the cap. This grating is set in a light angle-iron frame which is screwed directly to the woodwork. The manger is straight, built of $1\frac{1}{4}$″ hard-pine sheathing with a false bottom a short distance above the floor. In one corner of the manger is set a feed-box of cast-iron which is preferably divided into compartments and fitted with a rim lipped down on the inside, so as to prevent the grain being thrown out by the horse and, also, to prevent his eating too fast. The wooden edge of the manger is covered with cast or wrought iron to prevent its being gnawed by a cribbing horse.

Figure 4 illustrates another stall construction, differing in the construction of the floor. This is much preferable, also much more expensive. A water-tight flooring is carried over the whole stall-room and up under the stalls, being composed of 3″ x 4″ pine strips laid on the Dolbeare system, which will be described hereafter in detail. The gutter is of wood with wooden covers at intervals. The reason for using wood is that it can be more easily connected with the water-tight flooring and is not liable to be broken by horses stepping on it. The waterproofing is carried up to the wall and made tight by a base set in mastic. In order to obtain a proper pitch the floor is furred up 3 inches at the head of the stall, as shown by the figure. Over the Dolbeare flooring is laid a wearing floor of 3″ spruce plank, bevelled in the length to a thickness of $1\frac{1}{2}$ inches at the head of the stall, so that the upper surface, when set, pitches only $1\frac{1}{2}$ inches. Part of this wearing floor towards the rear is laid open, and the joints filled with $\frac{7}{8}$″ x $\frac{7}{8}$″ strips of maple. All of the joints in the 3″ planking are run in hot mastic or composition and if properly constructed, the floor ought to be absolutely tight. Where several such stalls are arranged in a row, the floor timbers are pitched sidewise $\frac{3}{8}$″ to the foot and the flooring and gutters are laid following this pitch, to ensure proper draining.

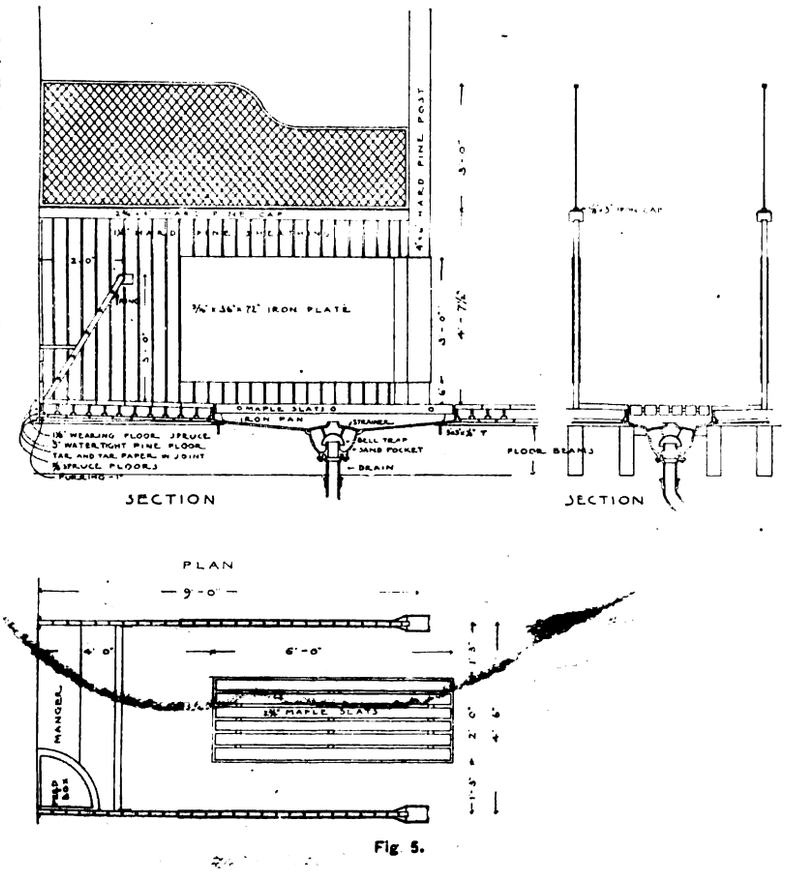


Fig. 5.

Figure 5 shows yet another stall construction which has some special features. The floor is one of the most satisfactory that is on the market. It is easily cleaned, does not smell badly, and has the advantage of allowing the horse to stand on a level surface and can, furthermore, be set flush with the floor of the passage at the rear of the stalls. In this construction the floor-beams are spaced so as to permit of a cast-iron pan being placed under the centre of each stall. The water-tight wood flooring is pitched one inch towards the head of the stall and sprung over a thin furring under the lines of the partitions, so that the stall slopes on all sides towards the centre. Over this is laid the wearing floor of $1\frac{1}{8}$″ square-edged spruce, which laps onto the iron pan. The pan is lipped all around and provided with a rim which fits under the water-tight flooring and is set in hot tar or mastic, an inner lip being carried to the top of the wearing floor. The pan is dished towards the centre and the outlet is fitted with a trap and cover which collects the loose droppings of straw, etc., allowing the liquid to run off, so that the urine does not accumulate to any extent and fermentation and consequent bad smell are thereby avoided. The iron pan rests directly upon the timbers, and two cross supports of T-iron. In the pan is a wearing slat floor of $2\frac{3}{4}$″ x 3″ maple strips set 1″ apart and rodded through the centre thrice, being strongly bolted so that a quadruple wear can be got out of it, the frame being reversible in each sense, and raised entirely clear of the bottom of the pan by means of wide lugs on each end.


Fig. 6. Iron Stall Floor.

This type of stall floor is manufactured specially by the Lynn Stall Co. Somewhat similar stalls, varying in detail though not in principle, are made by several manufacturers of stable goods.

The stall represented by Figure 5 is intended to provide for the hardest wear. The angle where the stall partition joins the post on each side is filled-in with a bevelled piece of wood, so as to afford less opportunity for the horse to catch his hoof should he be disposed to kick, and the partition is sheathed on each side with wrought-iron $\frac{3}{16}$″ thick carried entirely around the post. Furthermore the stall-cap is protected by a plate of iron.

In place of the iron pan the entire bottom of each stall is sometimes formed of concrete or asphalt dished towards the centre and provided with a bell-trap and cover, essentially on the principle of the iron pan, with a raised slat floor. There seems to be difficulty in making a construction of asphalt or concrete perfectly tight, and where the stalls are raised on the second story, as is often the case in large boarding-stables, or where there is a cellar under the stable which it is desirable to keep thoroughly clean, the concrete or asphalt will very often leak, owing to unequal settlements or shrinkage of lumber or walls. If asphalt could be made perfectly tight all around and would stay so, it would be far preferable to any other material, as it is non-absorbent and non-corrosive; but thus far experience and observation seem to point to an iron stall-pan as, on the whole, the most satisfactory arrangement.

Wood and iron are used in a variety of combinations. Sometimes an iron pan is laid over the whole stall area and separate maple slats or blocks are fitted into corresponding flanges in the iron, as shown by Figure 6, the iron pan connecting directly with the gutter at the rear. If this form is bedded thoroughly upon something which will not shrink or move in time, it makes a very serviceable stall and the wooden blocks can be replaced with very little difficulty. The incline of the slats is about 1 inch. Again, stalls have been built of brick, the passageway at the rear of the stalls also being of brick, and the stall itself dished equally all around, so that the drainage will run into a branch of the gutter which is carried up to near the head of the stall. This form, however, is not very common.

Figure 7 shows an arrangement of the cast-iron pan either laid upon wooden floor-beams or on concrete resting directly upon the earth.

The box-stalls do not differ from single stalls, except that they are square, and a square pan used under the centre, or the whole stall is made to pitch towards the rear. Access to a box-stall is had through a heavy gate, hung by brass strap-hinges, kept up a foot from the floor and carried as high as the stall partitions.

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It is sometimes customary to put on one end of the manger a hay-rack consisting of a grating of iron bars, leading to which is a chute from the story above. This is not always considered advisable, and more often the hay is pitched down to the stall-room floor through a trap in the ceiling, and is then either thrown by hand into the fore part of the stall or into the manger.

At the head of each stall, facing the horse, should be firmly attached a heavy ring for hitching, held by not less than four stout screws. An arrangement has been devised, by means of which the unhitching of the horses, in case of necessity, can be simultaneous and can be effected without entering the stall. This is shown by Figure 8. The halter is fitted with a length of chain at the end and the terminal link is caught in a hasp, to which it is very easily attached, but which the horse cannot disengage. A single halter can be detached, or a whole row of halters can be released at once by pulling the lever at the end of the line of stalls. A contrivance of this kind is very desirable in large stables.

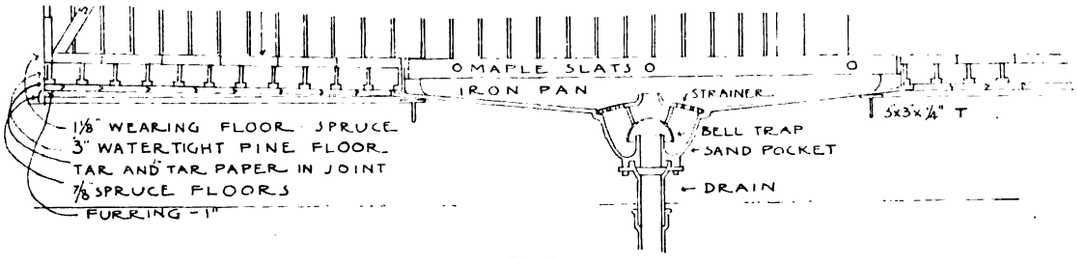


Fig. 5a.

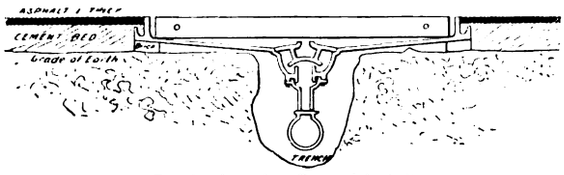


Fig. 7. Lynn Iron Pan and Asphalt.

If it is thought desirable to have water constantly within reach of the horse, but in small quantities, so he shall not consume too much, this is effected by a patented device consisting of small watering-troughs, which are placed at the corner of each manger, connected by water-pipe, the supply to which is throttled down so that a very small amount of water only can be used at once, and the overflow so arranged that only a small quantity of water can collect in the trough at one time.

All of the wooden finish about the stall-room and stalls should receive three coats of the very best spar varnish, and all of the hardware, except as a matter of expense, ought to be of solid bronze or brass.

Adjoining the stall-room on the sunny side of the stable, it is well to provide for a paddock. Local circumstances will generally fix the size of this, but it ought not to be less than 20′ x 35′, and the larger the better. Against the stable-wall in some portion of the paddock is built a platform, 7′ x 9′, consisting of a wooden grating set up somewhat from the ground, upon which the horse-bedding is thrown to air and dry, and in another corner of the paddock, as close to the stall-room door as possible, a large box can be placed to receive manure. The arrangements for disposal of manure constitute the most unsatisfactory feature of many stables. The manure is very commonly thrown directly from the stall-room into a vault excavated immediately beneath, this vault most frequently having no ventilation whatever, though sometimes it has a small outside window. This is by no means the best arrangement, as even with the utmost care the manure is liable to ferment and the fumes do a great deal of damage to everything around the stable, and above all, it is not in any sense tidy or clean. A better plan is to throw the manure into a box in the paddock, and see to it that this box is emptied at frequent intervals. This box should be about 5′ x 7′, with top arranged to entirely take off, but with a small trap in the top for pitching in the manure. This box need not be over 3 feet deep. If considerations of cost will permit, a still better plan is to build a brick pit outside of the stable, extending 2 feet below the surface of the ground and 2 feet above, the pit being lined with enamelled brick, floored with asphalt and fitted with a hinged wooden cover.

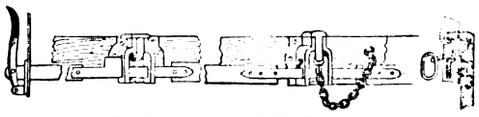


Fig. 8. Walters's Stable Fastener.

Figure 9 shows a plan for a small stable, incorporating the various features previously described.

C. H. BLACKALL.

[To be continued.]

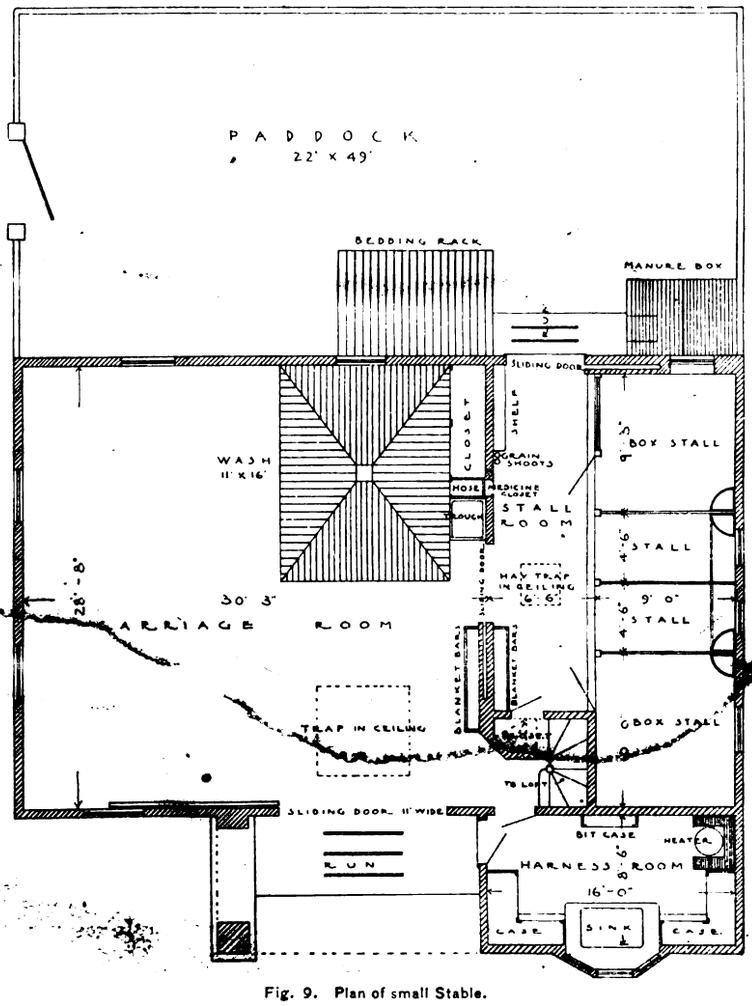


Fig. 9. Plan of small Stable.

THE TEST OF THE ROEBLING SYSTEM OF FIREPROOF CONSTRUCTION.

THE protest made the Department of Buildings of New York City that the test, made September 3d, of the structure submitted by John Roebling's Sons, was not thorough, as the fire had not been maintained a sufficient length of time, has led to a second trial, in which a new building was subjected to fire for a period of five hours.

In the first test, a comparative one, two fireproof floors were built eight feet above the ground, one according to the Roebling system, the other an ordinary hollow-brick flat arch.

After being loaded to 9,000 pounds, distributed over fifteen square feet, it was subjected to fire for an hour and a quarter. After extinguishing, it was found on examination the fire had not materially injured either arch. It was maintained, hence the protest, that the experiment was of no value, as the fire should have been continued until one or the other arch failed. Accordingly, on October 27 the same two arches, after having been replastered — the first coats being destroyed by fire and the water used in extinguishing the fire — were loaded with pig-iron to the extent of 1,400 pounds per square foot and a fire started. In a few moments the white coat of plaster peeled off; after two hours, the copper plug for indicating the temperature fused; at three hours, cracks formed around the hollow-brick arch and after a few minutes opened parallel to the wall along both arches, the loaded portion of the hollow tile section settling; in ten minutes more, the flat arch failed, carrying the pig-iron loading it suddenly to the ground, the portion not loaded remaining. The Roebling arch remained intact, its plaster ceiling being badly cracked but still adhering. The data for this test are as follows:

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Ironwork erected August 10th.
Roebling arch concreted August 11th.
Flat arch erected August 10th to 11th.
First fire and water test September 3d.
Ceilings replastered October 1st.
Thickness of crown, Roebling arch, 3 inches.
Depth of hollow-brick arch, 10 inches.
Size of beams, 10 inches, 25 pounds.
Spacing of beams, 5 feet, centre to centre.

Proportions of cement mortar used in setting flat arch.....
{ 1 part Aalborg Portland cement.
{ 1 part sand.

Proportions of concrete used in Roebling arch .....
{ 1 part Aalborg Portland cement.
{ 2 parts sand.
{ 5 parts steam ashes.

NOTE.—This test was an unofficial test, but was witnessed by several members of the Department of Buildings as well as a number of others interested in the subject of fireproofing.

Although fulfilling every requirement it was decided to convince the more exacting, and a second test structure was erected and subjected to a continuous fire for five hours. The dimensions were as follows:

Size of test structure, 12′ x 16′.
Spacing of iron beams, 4 feet.
Distance between supports of iron beams, 15 feet, 6 inches.
Size of iron beams, 10 feet, 25 pounds.

Proportions of concrete in floor arches...
{ 1 part Aalborg Portland cement.
{ 2 parts sand.
{ 3 parts steam ashes.

Thickness of crown at middle of arch, 3 inches.

Proportions of concrete for filling between nailing sleepers.....
{ 1 part Aalborg Portland cement.
{ 2 parts sand.
{ 10 parts steam ashes.

Thickness of filling over floor arches, 2 inches.
Floor arches were concreted on September 26th.
The concrete used in this test was identical in proportions and manipulation with that used in all the regular work executed by this company.

The floor was loaded with an evenly distributed load and the fire started, a regular grate having been built for the purpose of obtaining a maximum temperature. In an hour the temperature was 1,700°, increasing at two hours to 2,300°, the highest point reached: from that time to the end the temperature varied from 2,000° to 2,100°. About half-past one the ceiling fell, it is supposed, as it was intact at the last observation made, but on opening at two o'clock to extinguish the fire it was found to have fallen.

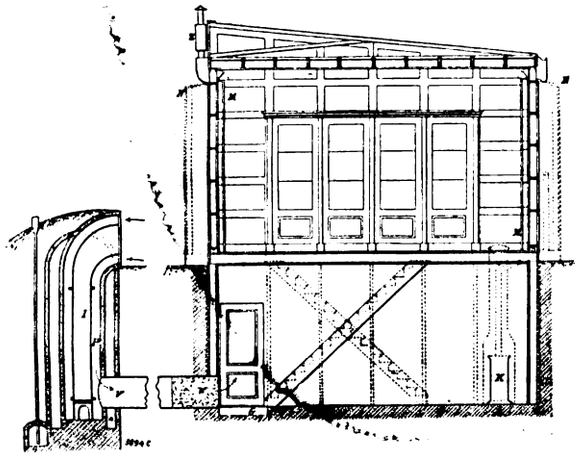
The examination made proved the arches were intact, though the beams deflected two and one-quarter inches, which diminished on the cooling of the beams to one and a half inches. A stream of water was then directed on the roof, which soon leaked at the central arch where the deflection was greatest.

The wires supporting the ceiling were, for the greater part, carried down with the plaster, which left the bottom flanges of the beams exposed.

At this writing there is in progress a further test as to the ultimate strength of the arches as they stand.

The Department of Buildings conducted the experiment and registered all data as to temperature, deflection, etc.

A REMARKABLE HOUSE.



WHEN we take up a study it is often impossible to foresee the end to which it may lead. The accurate determination of an atomic weight has resulted in the discovery of new elements. The observation that a magnet moved when suspended above a rotating copper disc was the germ of dynamos and motors. Investigations bearing upon movements which at times violently affect the earth's crust have carried us to the unfelt movements of the same, the subsurface precipitation of moisture, the action of stones as fertilizers, the transposition of plants, and to the study of phenomena of more direct importance to the farmer than the physicist. Bacteriology has led Dr. W. Van der Heyden, of Yokohama and Utrecht, to devise and construct a dwelling which he has described as "Eine Hygienische Wohnung." As a sanitary dwelling, relatively to ordinary types of houses in which we exist to swallow vitiated atmosphere, sometimes hot and sometimes cold, it seems to possess many marked advantages. But its sanitary aspect is by no means its only title to recognition. Although the inventor of this new departure in house construction lays emphasis upon its sanitation, he also sees in it a means of shielding ourselves against extremes of temperature, of economy in the use of fuel, and a protection against the effects due to the more serious movements accompanying earthquakes. To us, whose fortune it is to live in a country where the foundations of our buildings are not subjected to violent agitation, this latter feature in Dr. Van der Heyden's house possesses but small interest, but as this building was built in Yokohama, where it now stands in the grounds of the General Hospital, and since its erection in 1891 has already had to withstand about three hundred shakings of varying degrees of intensity, that it should be earthquake-proof became a necessary feature.

Although the writer is not able to give any minute details of this remarkable structure, yet inasmuch as he saw it when in process of construction and because the basement was kindly put at his disposal for the erection of instruments designed to show changes of level which might precede or accompany an earthquake, which instruments required isolation from great changes in temperature, the opportunities for studying its behavior and confirming the conclusions arrived at by its inventor were numerous.

Roughly, the house is 44 feet in length, 23 feet in breadth, and 17 feet in height, and is built of glass. This glass is rough plate approaching ½ inch in thickness, and each wall is made of two layers of this material separated by a space of about 4 inches, which space is filled with a strong solution of a salt-like alum, or one of the commoner salts of soda.

To carry out this construction, panes of glass measuring about three feet by two feet are fitted into two sides of a cast-iron frame to form a box. A number of these boxes are screwed together, end to end, until a row the length of a wall has been formed. On the top of a row, felt and boards are placed, above which comes row after row until the required height of a wall has been reached. It was the original intention of Dr. Van der Heyden to construct the roof in a manner somewhat similar to the walls, but experience has shown that this is hardly necessary. The roof consists of glass plates with strips of rubber between the joints, above which there is a layer of ashes and a light frame of wood covered with cement. In this instance the roof is not translucent, but is made of materials which are fairly impervious to the heat from outside and to the escape of heat from the inside.

From this description the house is, therefore, a well-lighted box-like space without windows or doors. There are no openings, cracks, or fissures to admit air, moisture, insects, dust, or microbes, while the function of the walls in excluding heat and cold will be referred to presently. On account of the color of the solution in the walls, which color may be varied to suit taste or the requirements of experiments, the light in the room at the time of the brightest sunshine is diffused and pleasant. The floor of the room is made of double planks, between which there is a layer of sawdust. In this floor there are grids for the admission of air and four large plates of glass, which give light to a lower room which is partially underground. The entrance to the dwelling is by means of a corridor leading to the lower room and a staircase. Doors are so arranged in this corridor that but little air is admitted while a person is entering or leaving the building. Fresh air is obtained from a pipe, or pipes, which rise vertically above the ground at some distance from the house and communicate with a tunnel or pipes leading to the lower room. Before entering this room the air is filtered by passing through cages filled with cotton-wool. As the air emerges from its filter it strikes a large pane of glass coated with glycerine, where the few microbes that may have succeeded in passing the net of cotton fibre are caught. By this means it is assumed that the air entering the room is as pure as an antiseptic dressing of Sir Joseph Lister's. From the lower room this purified air is allowed to pass through the regulating grids to the upper chamber, from which it is discharged around a space near the ceiling which in ordinary rooms is represented by a moulding. Running round the building on the outside and communicating with these air-openings there is a belt-like chamber covered with ordinary window-glass. Usually it is found that the heat in this belt is sufficient to cause a current towards a chimney, also constructed to be heated by the sun. In connection with this chimney there is an opening for the rain, which is discharged at its base to create a draught after the well-known manner of a water trompe. The general result is that the more the sun shines or the more it rains, the greater is the ventilation. When sun and rain fail, a small stove may be lighted to create the necessary current, but this has seldom been required. To obviate the effects of earthquakes, the upper building is carried on balls resting in cups, that is to say, it has a free foundation similar to those described in articles on "Construction in Earthquake Countries" (*Engineering*, July 3, 1896, page 2). From this imperfect description of Dr. Van der Heyden's somewhat costly and bold experiment we will next turn to its working.

So far as ventilation is concerned, calculations based upon records obtained from anemometers placed in the air-ways, this has been shown to have been at all times ample. Although the bulk of this air as it enters the rooms is purified, there is from time to time added to it a small quantity of ordinary unfiltered air entering with each person, who also, we may presume, carries on his dress and

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body a certain number of the omnipresent microbes. These, however, because they come into a room bathed in light, without a single dark corner in which they can multiply and develop, are quickly doomed to extinction, especially in a chamber which lends itself to disinfectant sprays and washings. Whether this is absolutely so or not, it is beyond the power of the writer to pronounce upon, but the fact that Dr. Van der Heyden finds that butter, milk, and other putrescible substances remain in a fresh state longer in his house than in ordinary dwellings, indicates that a chamber in which the air, if not absolutely pure, approaches such a state, has practical advantages which appeal to the housekeeper. By placing catches partly similar to those before the openings through which air enters the house in the sun-belt, and by other means, carbonic acid, organic alkaloids, the products of expiration and exhalation generally, dust and any impurities are deposited before the outgoing air passes into surrounding space. The arrangement for the oxidization of the unassimilated products of the human system and their conversion into nitrate of ammonia and other inorganic salts is also instructive. Dr. Van der Heyden evidently regards every dwelling, and especially hospitals, as possible foci of infection, and although it is highly important that these should be supplied with pure air, he considers it equally important that they should not be allowed to discharge anything in the form of liquid, solid, or gas which could possibly carry with it the germs of contagion. Even the water used for washing and that from the kitchen is rendered innocuous before it leaves this sanitarium.

We next come to a feature in the house which, to the minds of those who take little heed of dust and microbes, is suggestive of development along many lines for the economy of labor and of fuel. During one winter that Dr. Van der Heyden was living in his house, the writer, for the purpose of attending to his instruments in its basement, had often occasion to visit him, and during that winter he did not require to burn any fuel for heating purposes only. From time to time, however, during cloudy weather, a little fuel was used for the ventilating-stove. The total amount for the season could not have exceeded half a ton, but whatever it may have been, after the addition of the "sun-belt," the small consumption of fuel was practically reduced to zero. In Mr. Van der Heyden's house no inconveniently low temperature was felt, while in adjacent houses on several occasions water froze in bedrooms. It may, therefore, be concluded that at night the temperature closely approached and sometimes fell beneath the freezing-point. During the day, with fires burning in grates and stoves, assisted by the sun heat through windows and glass verandas, the temperature of these same rooms rose at least to 60° Fahr. The daily range in temperature experienced in an ordinary house in central Japan may, therefore, for the winter months, be taken at about 30°, and to attain the daylight temperature for, say, a couple of rooms, from five to seven tons of coal are burned. The maximum range of temperature in the glass house, as shown by a self-recording thermometer, was less than 6.5° Fahr. An experiment made in the house during freezing weather in January was to note the fall in temperature while the ventilating-stove, which is arranged to warm the incoming air, was extinguished. In 53 hours the fall was from 66° Fahr. to 49° Fahr., and as the surface of the house is 108 square metres, this represented a fall of $\frac{1}{2000}$ degree per square metre per hour.

The action of the building as a heat absorber and heat retainer is, briefly, the following: When the sun shines, its heat, rather than passing through the glass walls to raise the temperature inside, as it does in a greenhouse, is taken up by the liquid they hold, and more salt enters into solution. At night, when the temperature falls and the liquid cools, there is a tendency for this extra quantity of dissolved salt to crystallize, and whilst crystallizing, heat is given out. Because on the outside of the fluid walls there is an air-space bounded by ordinary window-glass, the escape of heat outwards is minimized, with the result that the heat trapped during the day is given up to the interior of the building, which, unlike the greenhouse, cannot fall rapidly in temperature.

When the building might fail would be in the winter months, after three or four days of cloudy weather. To meet this contingency it becomes necessary to light the ventilating-stove, which might be of gas or petroleum, and warm the incoming current. In very many countries outside the British Islands, three or four winter days of continuous cloud are of comparatively rare occurrence; but even in Great Britain we have a few days of sunshine, and Dr. Van der Heyden shows us how to capture and utilize a portion of this heat. A plant house, for example, built after his plan ought to be worked at less expense and with less trouble than one built in the ordinary manner and requiring artificial heat. From want of judgment, and often from carelessness, the omission to light a fire in a greenhouse is attended with results which ought not to occur in a house with a supply of heat within its walls.

In summer time what we look for and obtain, by throwing open windows and doors, the doing of which may be as often forgotten as closing them, is usually a reduction in temperature. In the Yokohama house the thermographic records show that this has been attained in a very marked measure. Although this house stands in the open, with its flat roof and walls exposed to 14½ hours of summer sun, not cooled by a sea breeze, not sheltered by trees, and not divided by sheltering walls in its interiors, these records have shown that day after day the temperature has never been above, and often been below, that of the most sheltered place that could be found in the neighborhood. In five ordinary houses, taking apartments considered to be cool and pleasant, the temperature in them was always found to be several degrees higher than that in the sanitary building. The explanation for this is that the fluid walls take up the direct heat of the sun, whilst the air before it enters the building, because it passes through tubes underground, is reduced in temperature. In winter the latter arrangement leads to a slight rise in the temperature of the inflowing current.

In Japan the temperature of the air in summer rises to 80° and 95°, and is often loaded with moisture. In the glass house the temperature was fairly constant at about 74° Fahr. To reduce this 3° or 4° more, and to get rid of the suspended moisture, we understand that the air coming through the underground passages before it enters the lower chamber is passed to the bottom of a well which has been sunk in the basement.

In this imperfectly described experiment of Dr. Van der Heyden's we also see, in addition to what we have described, a building in which there should be a total absence of insect life. The man who lives in a warm country knows the pleasure of a room free from mosquitoes and other pests, which not only cause irritation by their noise and bites, but which in some instances have been the means of transmitting disease, whilst the absence of dust will always appeal to domestic servants. The variations that can be made in the forms of construction that have been here indicated are numerous. Should we, for example, only desire to capture sun heat, it possibly may be accomplished by two metal walls, carrying between them a solution of soda sulphate (?); the outside walls can at night time be covered with a layer of felt. Whether this is practicable or not, that sun heat may be caught within a chamber until it even causes the ebullition of water is realized in the heating box of De Saussure, while the house of Van der Heyden, however we may be pleased to vary it, shows that the conditions under which we ordinarily exist are capable of modifications attended with advantage.—*Engineering.*

SOCIETIES

T-SQUARE CLUB OF PHILADELPHIA.

THE regular meeting of the T-Square Club was held in the office of Mr. Frank Miles Day, 925 Chestnut Street, on Wednesday evening, November 4th. In the absence of President David K. Boyd, Mr. Louis C. Hickman occupied the chair.

Competitive designs for a typical "Bicycle Pavilion," in connection with the proposed bicycle paths in Fairmount Park were submitted. These pavilions are to be located every four or five miles apart and provide ample room for one hundred wheels; also a resting and refreshment hall, music-stand, service-rooms, check-room and repair-shop.

First Mention awarded to E. Perot Bissell.
Second Mention awarded to George Bassett.
Third Mention awarded to W. P. Trout.

Messrs. F. M. Mann and E. V. Seeler lead the criticisms of drawings. CHARLES E. OELSCHLAGER, *Secretary.*

MINNESOTA CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE regular monthly meeting of Minnesota Chapter, A. I. A., was held on Friday evening, November 6th, at West Hotel, with President Jones in the chair and ten members present.

After the usual dinner and disposal of routine business, the subject of the evening, "The Inception of Modern Steel Construction," was taken up in a paper by E. P. Overmire, followed by a general discussion.

This is the first of three meetings to be devoted to "Modern Steel Construction," the two succeeding papers to be on "The Progress" and "The Present State of Modern Steel Construction."

An instance of unprofessional conduct, on the part of a prominent firm of architects, was brought to notice of the Chapter, but, inasmuch as they are not members of the Chapter, no action could be taken.

The next meeting will be held at St. Paul, the first Friday evening in December. E. P. OVERMIRE, *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

REVERSE OF THE JOHN BOYLE O'REILLY MEMORIAL, BOSTON, MASS. MR. DANIEL C. FRENCH, SCULPTOR, NEW YORK, N. Y.; MESSRS. WALKER & KIMBALL, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued with the International and Imperial Editions only.]

THE bronze figures shown in this view of the monument are somewhat more than life-size and represent, respectively, "Patriotism," "Erin" and "Poetry."

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THE LIBRARY STACK BUILDING FOR PRINCETON UNIVERSITY' PRINCETON, N. J. MR. WM. A. POTTER, ARCHITECT, NEW YORK, N. Y.

ENTRANCE TOWER OF THE SAME.

COURT-YARD VIEW AND PLAN OF THE SAME.

STABLE FOR GEO. G. HALL, ESQ., 11–13 BYRON STREET, BOSTON, MASS. MR. WILLIAM WHITNEY LEWIS, ARCHITECT, BOSTON, MASS.

THE materials used in the front of the stable are Milford pink granite for the plinth, coral-colored bricks from the Perth Amboy Terra-Cotta Co., and Indiana limestone for dressings and cornices.

The owner's room is finished with marble mosaic floor, oak dado and walls, and ceiling tinted in oil-colors; the toilet-rooms attached are finished with oak and marble, the floors being of mosaic.

The harness-room is fitted with harness cases on three sides inclosed with sliding glazed doors; the floor is of white maple. In the centre of this room stands a convenient form of sink supplied with hot and cold water. The ceiling of harness-room is formed by glass floor of the second story, over which is a large skylight. The carriage-room walls are sheathed 6 feet high with white maple, and plastered walls and the ceiling are tinted in light oil-color. At one side of the carriage-room is the washing-floor made of a single slab of North River flagging stone, 11′ x 14′, dished towards and drained from the centre. The wall at one side of washing-floor is lined with Knoxville marble and the water-trough is of a block of Milford pink granite. Hot and cold water are supplied to trough and an overhead revolving carriage-washer is fixed above washing floor. At one side of the room is a large blanket-locker fitted with shelves and with case of drawers; at the other side of the room is the carriage-elevator of improved design. The floor of carriage-room is unobstructed by columns, a steel girder with a span of 33 feet supporting the floors and roof above.

The stall-room including the walls and ceiling is finished in lightest colored white maple and contains eleven box-stalls, averaging 9′ x 11′ in size, water-trough, closets for tools, medicine-locker and grain-closet. The stall-room is abundantly lighted, having, besides the large windows, a skylight 30 feet long fitted with sliding ceiling-sashes, giving ventilation through a monitor skylight on roof.

The under floors of stalls are built of concrete and iron resting on the foundation walls. The upper floor of stalls is of maple and, with exception of a tight border about 18 inches wide, is an open rack over a dished basin of Portland-cement concrete; the racks being folded back, the floor of basin can be cleaned and then thoroughly flushed with water supplied through perforated brass pipes, fixed in pocket between concrete and wooden floors, the flushing-pipes being operated independently for each stall. Drainage from centre of each stall basin is carried away by vitrified earthenware pipes encased in Portland cement concrete. The stall doors slide through the iron posts into pockets in stall partitions and doors are so hung that no accident can throw them from the tracks. The lower panels of stall doors are fitted with gratings to allow thorough ventilation of stalls. No hay-racks are used in stalls and flush-sockets in partitions receive aluminium composition feed-boxes at meal-times. The stall-room is at all times supplied with fresh air through a fresh-air duct, 20″ in diameter, fitted with a stack of radiators just sufficient to take chill from the air in winter, and foul air is exhausted through a large shaft heated by smoke-flue of hot-water heater.

The second story contains besides a tenement for the head coachman, harness and carriage storage-rooms and hay-loft, the latter fitted with large grain-bins of galvanized-iron.

The building is lighted by gas and electricity, and warmed by a hot-water heater placed in a small water-tight cellar, the grade of the lot being so low that cellar floor is at all times from 3 to 4 feet below level of water in the soil.

[The following named illustrations may be found by reference to our advertising pages.]

STABLE FOR EBEN D. JORDAN, ESQ., CHILTONVILLE, MASS. MESSRS. WHEELWRIGHT & HAVEN, ARCHITECTS.

RESTORATION OF SGRAFFITO WORK CREDITED TO PIERINO DEL VAGA. NOS. 39–40 VIA TORDINONA, ROME.

A GROUP OF ORIELS.

[Additional Illustrations in the International Edition.]

PULPIT IN THE SCHLOSSKAPELLE, ASCHAFFENBURG, BAVARIA.

[Gelatine Print.]

THE pulpit in the castle chapel is of a fine-grained clear greenish sandstone, the reliefs and figures about the base and on the pulpit front, as well as the cherub's heads, are of alabaster and white marble. Above and below the reliefs in the frieze are bands of grayish-red marble. The reliefs show, in free and artistic handling, SS. Gregory, Ambrose, Augustine and Jerome. The figures in the round between the reliefs represent the Four Evangelists and the Apostles Peter and Paul. The figures about the base show Moses, David and the heavy figure of a youth. All the carving about the pulpit itself is executed with extreme fineness. The uninteresting sounding-board above with its formless supporting eagle is executed in wood and is of much later date than the pulpit itself.

ENTRANCE TO SPIRAL STAIRCASE OF THE SCHLOSS AT ASCHAFFENBURG, BAVARIA.

[Gelatine Print.]

THE JOHN BOYLE O'REILLY MONUMENT, BOSTON, MASS. MR. DANIEL C. FRENCH, SCULPTOR, NEW YORK, N. Y.; MESSRS. WALKER & KIMBALL, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

THIS view shows the obverse of the monument as it is seen by one entering the Back Bay Fens from Boylston Street.

DESIGN FOR A TRIUMPHAL BRIDGE OVER THE SEINE. M. EDOUARD BÉRARD, ARCHITECT.

THESE illustrations are copied from *L'Architecture.*

DETAILS OF METAL WORK: BANK OF SCOTLAND, BISHOPSGATE, LONDON, ENG. MR. W. W. GUYTHER, ARCHITECT.

THIS plate is copied from the *Builder.*

RESTORATION OF THE TOWN-HALL, TÜBINGEN, WÜRTEMBERG.

THIS plate is copied from *Architektonische Rundschau.*

SECOND PREMIATED DESIGN FOR THE PRESBYTERIAN THEOLOGICAL COLLEGE, CAMBRIDGE, ENG. MESSRS. SETH-SMITH & JENNINGS, ASSOCIATED ARCHITECTS.

THIS illustration is copied from the *Building News.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A CORRECTION: THE U. S. CAPITOL.

WASHINGTON, D. C., November 5, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Figure 54 in article, "History of the United States Capitol, No. VIII," has the eastern view of Capitol inserted instead of western, which shows Bulfinch's portico.

Yours truly, GLENN BROWN.

NOTES AND CLIPPINGS

A CARLYLE ANECDOTE. — A Scotch visitor to the Carlyles in Cheyne Row was much struck with the sound-proof room which the sage had contrived for himself in the attic, lighted from the top, and where no sight or sound from outside could penetrate. "My certes, this is fine," cried the old friend, with unconscious sarcasm. "Here ye may write and study all the rest of your life, and no human being be one bit the wiser." — *Household Words.*

ANCIENT CLOCK. — The ancient City of Rouen, France, owns the very earliest specimen of the larger varieties of the ancient clock-makers' triumphs. It was made by Jehan de Felains, and was finished and set going in September, 1389. So perfect in construction is this ancient time-recording machine that, although it has been regularly striking the hours, halves and quarters for more than five hundred years, it is still used as a regulator. The case of this early horological oddity is 6 feet 8 inches in height by 5 inches broad. For three hundred and twenty-five years it continued to run without a pendulum, being provided with what the old-time clock-makers called a "foliot." — *The Churchman.*

IRON PIERCED BY HAILSTONES. — One is justified in many cases in giving only a tentative belief to many of the big hailstone tales over which some travellers delight to spread themselves, says the *St. James's Budget.* A correspondent in Dholi, Behar, however, sends the indubitable proof of photographs to quite convince us and our readers of the terrible nature of the hailstorm which occurred in his district recently. The storm passed over the greater part of the districts of Mozufferpore and Durbungah, but it appears to have concentrated itself with special fury over the indigo factory called Dholi. Here the storm was terrific, even for tropical regions, the hailstones weighing as much as five ounces. On an average they were as large, if not larger, than cricket balls. It can be easily understood that the damage done was great. Not a whole tile was to be found in the roofs, trees were uprooted, birds were killed, and general destruction wrought all round. What is more astounding, the corrugated iron roofing over many of the factory buildings was riddled as if it had been shelled by a battery. We can quite imagine, as our correspondent informs us, that no storm like it has ever occurred in the district. Hailstones have, however, had the same terrific force in Africa, a sample of corrugated iron pierced in a like manner having been recently shown in London. — *Scientific American.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

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NOVEMBER 21, 1896.

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PROFESSOR HILPRECHT, of the University of Pennsylvania, has certainly made one of the greatest archæological achievements of modern times, in the discovery of inscriptions dating, at least, as far back as 6500 B. C., and written in a character which seems to be the rudimentary original of the cuneiform writing. It is only a few years since Rawlinson discovered the key to the translation of the cuneiform inscriptions, and Layard, who first brought these inscriptions to light, has been dead but a few months; yet, already at least fifty thousand inscriptions in cuneiform writing are in the possession of the great museums, and Professor Hilprecht is adding to them documents which bear about the same relation to them that the Phœnician inscriptions of the Mediterranean Islands do to modern English books; while, in Greece, we have been put in possession of numberless remains of people who had no alphabet or writing of any sort whatever. It is hardly necessary to say that the view of the infancy of the race afforded by the comparison of the works of men who had no conception of the art of writing with those of contemporary tribes which had just begun to work out a method of recording their words by a system of permanent marks, is a very interesting one. Professor Hilprecht's investigations have been made in the ruins of Nippur, in Mesopotamia, about one hundred and fifty miles south of Bagdad. Like all the towns of Mesopotamia, Nippur was built of sun-dried brick, and, as the buildings of one generation were succeeded by those of another, standing on the débris of the previous ones, the ground has risen, until the crest of the mound which marks the spot is about one hundred feet above the level of the surrounding plain. To see how far into antiquity the succession of superposed strata would lead him, Professor Hilprecht's party cut trenches down to the virgin soil, which they found at the level of the plain, a hundred feet below the summit of the mound of ruins. At the level which, from the inscriptions, is judged to belong to a period five thousand years before Christ, was found a sewer, arched over with brick, and a bridge, with two pointed arches, undoubtedly the oldest specimens of the arch yet discovered. So far, the earliest inscriptions, which probably date from 6500 B. C. have not been read, but, with the help of the transitional writing, which is found in all stages up to the perfected cuneiform character, there can be no doubt that they will soon be deciphered.

THE matter of encroachments upon the sidewalks, which has given so much trouble in New York for many years, is to be decided, according to the newspapers, by the summary revocation of all ordinances and permits for the obstruction of the space properly belonging to the sidewalks, and the enforcement of the regulations relating to the subject. These regulations, which date as far back as 1805, provided that in certain streets, which were occupied for residences, and which were laid out of special width for the purpose, a space fifteen feet wide, in front of the walls of the houses, might be enclosed and planted with grass or shrubs, for the pleasure of the abutting owners, and that "stoops," meaning the flights of outside front steps, characteristic of New York, with the porches which often crown their tops, might project not more than nine feet into this reserved space, and areas, for basement entrances, might also be constructed in them, within a space of five feet in width, adjacent to the front wall of the house. As New York houses have no rear entrances, the approach to the basement door must be contrived in front, and this plan provided ingeniously and effectively for accommodating the principal and basement entrances, and, at the same time, for securing spaciousness and a certain amount of rural beauty for the streets. For many years, such infractions of the ordinances as occurred consisted mainly in projecting stoops beyond the nine-foot limit, or in making them higher than the seven feet permitted by the ordinance; but when the residential streets began to be used for mercantile purposes, encroachments were attempted. The original ordinance wisely prescribed that "in case the said courtyard" (or reserved space) "should hereafter, in the opinion of the Common Council, be required for street, the same shall be thrown open for street." In conformity with this last clause, the courtyard fences were taken down on many streets, and the old grass-plots paved and added to the sidewalks, giving footways of magnificent widths. Meanwhile, however, the abutting owners, remembering that they had been entitled to put stoops and area steps in the reserved space, interpreted this as a license to set up glass showcases, ornamental porches and other structures in what had now reverted to street uses. For a long time these objects have disfigured the sidewalks and annoyed the public, and the efforts of the Department of Public Works to compel their removal will have the sympathy of every one who has no private interest in them.

ON the plea, seemingly, that the "Bacchante" is to be placed where her hot coppers can surely be kept cool by fountain jets, the Boston Art Commission has reconsidered its verdict and now accepts the statue for placing in the courtyard of the Public Library. In view of this occurrence, Bostonians may, perhaps, discover before long that Leda and her swan have been placed in the cloister garth of Trinity Church, over the way, where she will be as consistently in harmony with the Thirty-nine Articles as the Bacchante is in keeping with the cloistral character of a library. The precedent that has thus been established is one which will give much trouble hereafter, as all future action of the Commission is likely to be attended by a newspaper clamor, which happily has not in the past been invoked against the body legally empowered to decide what works of art the municipality may accept. It is a great misfortune that the simple question of suitability has been forced by the thoughtless to masquerade in the newspapers as a question of decency. As to the statue itself when seen in place, we find it no less pleasing, but no more suitable than we anticipated. However excellent the figure may be as a work of sculpture, the theme is unsuitable. It would have been quite easy for the architect to have selected a suitable theme, which would have permitted the sculptor to produce just as much grace and no less nakedness.

AN accident took place a few days ago in a twenty-three-story building in New York. One of the elevator cylinders leaked, in such a way as to let a car descend with abnormal speed, although at a far slower rate than if it had fallen by the breaking of the ropes. It seems that the safety-clutches on the car, which, as we suppose, were controlled by a governor, in the usual way, had been set to suit the high speed which is necessarily maintained, both in ascending and descending, in such lofty buildings, and, as the movement of the car did not exceed the limit to which the governor was set, they did not act, and the car, in consequence, descended to the bottom of the shaft, stopping with such a shock as to throw the passengers down, breaking the limbs of several of them.

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While the public will see in this mishap only an evidence of carelessness on somebody's part, architects will understand it as a warning that the present elevator system needs reconsideration for the needs of very high buildings. Already, elevator-builders generally arrange to run their cars down much more slowly than they run upward, on account of the greater danger of accidents from a sudden stoppage in a downward than an upward course; but, with structures more than twenty stories high, the rapidity, even of the descending trip, must be made as great as is consistent with safety, in order to give proper accommodation, and it is hardly yet known what the limit of safety is.

SUCH of our readers as may be interested in the price of structural iron will do well to prepare themselves for the advance which seems likely to be made before long. In this country, as readers of the market reports know, while the increased demand following the result of the election has, as yet, only been sufficient to start mills which had long been idle, prices are rather firmly held than advancing; but, curiously enough, the demand abroad has increased within a few weeks even more than it has here, and prices there already show an appreciable advance. In England, it is reported that exports of iron for the past year have been forty-five per cent greater than in any preceding year, and prices of pig-iron have advanced, while the rolling-mills are full of orders, at two or three per cent advance over recent prices. In France, although the output of pig-iron is now about four thousand tons a day in the two districts of Longwy and Nancy, it is taken up faster than it is produced, and stocks are diminishing, while the active consumption of manufactured iron portends a speedy advance in price. In Paris, during the month of July, 7,050 metric tons of structural iron and steel were brought in for use, against 5,220 tons in July of last year. In Belgium and Germany, demand is active, and the mills are busy. In Belgium prices have not been officially advanced, but no concessions are made, while, in Germany, the manufacturers of sheet-iron and steel wire have recently met and advanced the price of both these products. Although the prices of foreign iron do not, as was once the case, influence ours by competition in our own markets, since American structural steel is sold here, considering the quality, about as cheaply as the foreign material could be if there were no duty on it, the American mills have begun to export iron to such an extent that an advance in the foreign price may make this part of the business profitable; while, indirectly, the prosperity of the foreign manufacturers and consumers of iron means a greater demand for goods which the United States can still more advantageously furnish.

THE newspapers give a rather indistinct account of a plan undertaken by the Van Cortlandt family, to set apart ten acres of land belonging to the old Van Cortlandt Manor, at Croton, on the Hudson River, as a sort of historical cemetery, where ancient gravestones, dispossessed by modern improvements, can be placed in safety, and where they will be properly cared for. A beginning is already made, inasmuch as a part of the ground is formed by the family cemetery of the Van Cortlandt family, where lie buried many generations, not only of Van Cortlandts, but of Beekmans, Livingstons, Clintons, Van Wycks and others belonging to the great families of New York which have in times past intermarried with the Van Cortlandts. What will be the regulations under which the memorials of other people will be admitted to this august company we are not informed; but, as the history of the occupants of the Van Cortlandt Manor and their near relatives is practically that of the most patriotic and intelligent people who had to do with the formation of our Government, it is likely that nothing connected with the early days of the Republic would be rejected.

WE wonder if it has ever occurred to any one else, in wandering about the old graveyards in our Eastern States, that, in a certain way, no people, except possibly the French, are so aristocratic in feeling as the Americans. The French and Americans are very much alike in their conviction of the essential equality of all men, and in the unembarrassed frankness and good feeling among all classes which comes from that conviction, but with both that modified form, perhaps, of ancestor-worship which consists in the feeling that a person, whose ancestors have for many generations been honored in the community, ought to conduct himself in a manner which would be pleasing to those ancestors, is strong, and is undoubtedly becoming stronger in this country, as the differentiation becomes more marked between the families whose names appear on the tomb-stones in the Colonial cemeteries, and those whose grandfathers were citizens of some foreign country. To a certain extent, this feeling is a good one, and is worthy of cultivation by such means as, for instance, the gathering of historical gravestones in the Van Cortlandt cemetery, and it is not likely, that, in this country, it will ever be accompanied by special privileges in such a way as to make it formidable.

THE recent exhibition of the Arts and Crafts Society, in London, has called out a good deal of criticism from people who do not appreciate furniture made up of what one of them calls "a mixture of T-squares and drawing-boards," and who are unable to discover the advantages, for persons clothed in modern dress, of rush-bottomed seats, and chair-backs constructed of "laths." If it were only English people who were concerned in the question of the beauty or utility of these objects, we could leave them to admire them or not, as they saw fit; but one of the critics informs the readers of the *Builder* that art of this sort "apparently came, like a good many other questionable advantages, from America, and it is time it returned to the land of its birth"; and patriotism requires us to repudiate the idea that, because anything is ugly or ridiculous, it must have been designed in America. It is true that a mantel, illustrated by the *Builder*, the essential portions of which consist of two stoutish detached columns, square in plan, but with an elaborate entasis, and a base consisting only of a huge *congé* and fillet, each carrying a group of four precarious-looking spindles, on which rests a heavy shelf, recalls the ready-made monstrosities which were sold in American furniture-stores twenty years ago; but architects in America, if they ever designed such things, do so no longer. Another treasure of the exhibition, consisting of a circular board, held up by three other boards, plain, except for notches at the lower end, and tied together by another plain board, of triangular shape, secured to the vertical boards by tenons, two-thirds of which must be cross-grained, recalls the days when Eastlake's "*Hints on Household Taste*" filled the souls of furniture designers with such ardor for the true, if not the beautiful, that the manufacturers used to keep on hand stacks of imitation tenon-ends, complete with pins, which they glued in appropriate places over the surface of the "art furniture" of the period. That "art furniture," with us, has long been split up into kindling-wood, for which it was admirably adapted, and it is curious to see it reappear as a product of the most recent development of the "Arts and Crafts" of England. Of course, we do not mean to say that there were not, judging from the *Builder's* illustrations, many beautiful and interesting objects in the exhibition, but it must be confessed that the modern English tendency to exhibit, side by side with such things, all sorts of preposterous creations, clamoring for admiration because they are so queer, or so anarchistic, or so fleshly, or so shocking in one way or another, does not appear, so far as can be judged from this small bit of evidence, to have suffered any diminution.

THE electric-power from Niagara Falls has been successfully turned over the transmission lines to Buffalo, and is now at work propelling the Buffalo street-cars, and doing other work in the city, and the towns between it and the Falls. The system used does not seem to differ very materially from that employed, although on a much smaller scale, in several places in Europe. The current is an alternating one, and is brought over the wires from the Falls under a pressure of nearly eleven thousand volts. Arriving at the city limits, it is carried into a transformer-house, and reduced to three hundred and seventy volts; and the current for the street-cars is raised from this, by another transformer, to five hundred and fifty volts, which is the standard pressure for street-car service in Buffalo. The power is sold to customers in the ordinary way. The Buffalo Street Railway Company buys one thousand horse-power, which it uses as an addition to the four thousand horse-power produced by its own plant. There will be, however, within five years, fifty thousand horse-power available from the Buffalo wires, and the owners of the line are experimenting to determine the loss in transmission, and other conditions, upon which to base a tariff of prices for Buffalo consumers.

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GERMAN CASTLES.[1] — IX.

THE PALACE EXTERIOR.

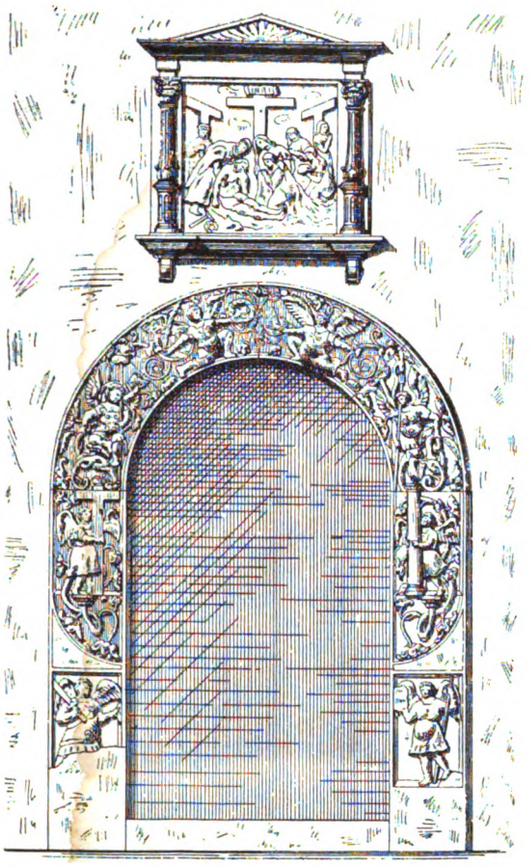


Fig. 66. Doorway to Chapel of Castle Hartenfels.

IN the Protestant sections of the country, comparatively few castles have a palace chapel, but where such chapels do exist, or once existed, some feature in the architecture of the façade betrays it. If there be no turret or choir-like projection, as in Castle Hartenfels, there is a portal inscribed with sacred symbols, or a portion of the wall is buttressed after the fashion of Gothic ecclesiastical buildings. The last is the case, for instance, in Castle Schlieffenberg, the seat of the Counts of Schlieffen, in Mecklenburg. In Castle Hartenfels, at Torgau, besides the bay-window of the chapel choir, that marks the place of the sanctuary to the view, there is an arched doorway, enclosed within a broad, flat, band-moulding, sculptured with angels and vegetable ornaments (See Fig. 66). The door is of historical interest as being that of the first Protestant chapel dedicated by Martin Luther. Hartenfels Castle itself has undergone a multitude of vicissitudes: it was a *castrum* in the thirteenth century, the seat of the Ascanian Electors in the fourteenth century, of the Margraves of Saxe-Thüringen in the fifteenth and of the Electors of Saxony in the sixteenth and seventeenth centuries. Here the dethroned king of Denmark and Sweden, Christian II, was hospitably housed in 1523. Here the first Protestant Alliance, which developed into the Schmalkaldic Union, was signed between Elector John of Saxony and Landgrave Philip of Hesse. Here the Torgau Articles, so-called, the fundamental draught of the Augsburg Confession, were drawn up and presented to Elector Johann Friedrich. The religious wars that broke out in consequence of the division of opinion which these Torgau Articles and other pronunciamentos of their like promulgated, proved disastrous and almost ruinous to the cradle of those writings, for Hartenfels Castle was repeatedly taken, occupied and evacuated during the Thirty Years' War, each time with some diminution in the splendor of its architecture and interior furnishings. But in 1694, when Augustus the Strong, the voluptuous and shameless first Saxon King of Poland, came into the inheritance of Hartenfels, it had been restored and beautified "as in its pristine glory." Augustus, however, the renegade of his family, who turned Catholic in order to become Polish King, disliked the Protestant reminiscences of Hartenfels, and exposed himself to them but seldom. In 1711, Princess Charlotte Christina Sophie, of Braunschweig, was to be married to the son of Peter the Great of Russia, and as the patroness of the princess, the Electress Eberhardina, declined to attend the wedding at her husband's court in Dresden, which was full of his mistresses, the ceremony of the marriage was arranged to take place in Torgau. And the chroniclers tell us further, that at this festive occasion it was that the great Tzar with all his men could not exhaust seven bottles of wine, "for the admirable and sly reason that Elector Augustus caused his men continually to renew the bottles through the well-hole in the floor of the tower under the table where their majesties did sit." The tower goes still by the name of the Bottle Tower, and the historic well-hole descends straight through two floors, like a flue, to the wine-cellar beneath. Did Augustus have the rest of the wine which Peter and his knights could not exhaust trans- ported to his schloss in Dresden?

His court came no more to Torgau. Castle Hartenfels was left unused. In the second Silesian campaign of Fredrick the Great, it was garrisoned by Prussian troops. And as the number of the victims of the sword and of sickness increased during the course of the Seven Years' War, Hartenfels was transformed by degrees into a hospital. In 1770, the Saxon Elector, Augustus III, relinquished the palace altogether and permanently to the public use, by having it fitted up for a poor-house, jail and mad asylum. A madhouse it remained until the wars of Napoleon Bonaparte, when it was occupied by Saxon troops, only to be besieged promptly by the French and taken. Marshal Ney housed his wounded in the castle; Napoleon sent his thither, too — several thousand they were in number, the victims of the battles of Dresden and Dennewitz, and as the typhus fever broke out among them, the palace by the time the animosities came to an end was in such a condition that no contractor could be hired to clean it. The Government was obliged to command chain-gangs of criminals to perform the work. These gangs scraped off the walls and floors of the castle, nothing being left untouched and as it had been, save the chapel alone. When finally cleaned, a portion of the palace was set aside for the residence of the military commander of the Torgau regiments; the great banquet-hall was rented to a company of minstrels and actors; several rooms were transformed into a gunmaker's workshop; others were devoted to the use of engineers and other officers; a large number were used as cells for state-prisoners, and a great portion was used, also, as barracks for soldiers. Hartenfels became Prussian property in 1815, as a result of the Napoleonic wars and it has remained so.

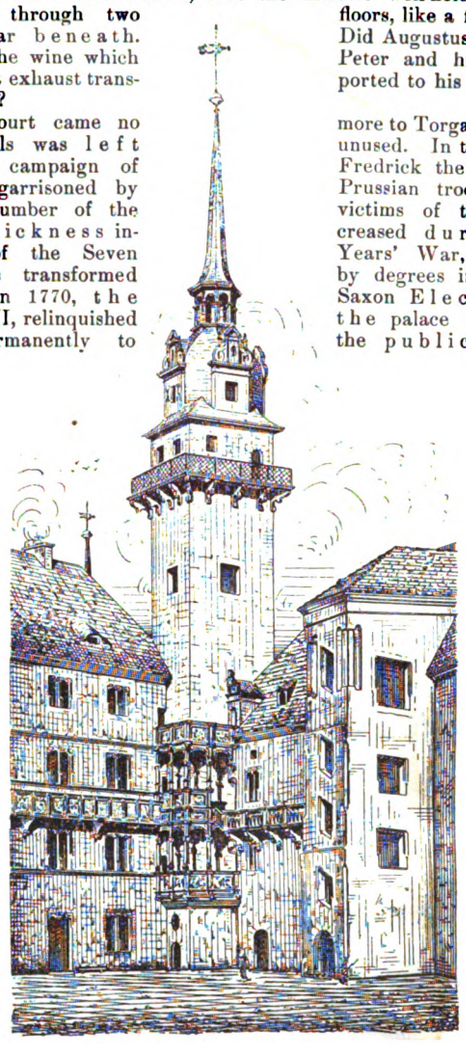


Fig. 67. Detail of Castle Hartenfels, Torgau, showing long Balconies.

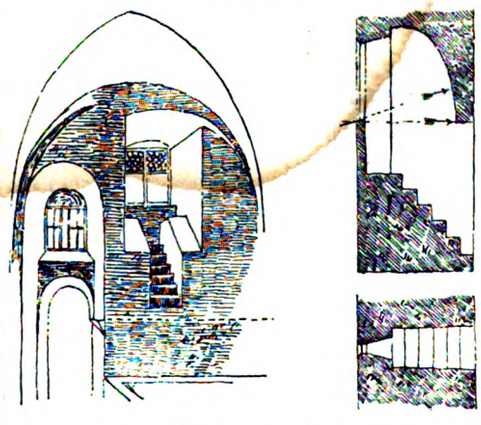


Fig. 68. Stufen-Scharte or Step-window.

[1] Continued from No. 1077, page 52.

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Its history is worth the quoting in passing, because so similar to that of many of the great castles in the country belonging to princes whose chief seats were distant and in larger towns. If wars broke out and the enemy invaded the country, the lesser palace was naturally neglected to the advantage of the prime residence of a prince. Then, in Germany, another fact is to be remembered when castles are met with, some of which are restored and kept as show places, while others, of much greater artistic importance, are left in desolation and fast-advancing ruin. That fact is the change of ownership; as, for instance, at Hartenfels. It was a primitive seat of the Wettins and is the booty of the Hohenzollerns. The Wettins may not restore it, proud as they feel at having it recognized by art historians as being one of the finest Renaissance palaces in the whole country; and the Hohenzollerns will not! They expend two thousand or so to preserve a relic of the first chapel dedicated by Martin Luther, and for the preservation of other single bits of sculpture. But why should they make a show-place of Hartenfels, as they have done with the (inferior) seats of their family? Hartenfels is Saxon by origin, not Prussian!

The historic situation in respect to works of art is not analogous in Germany to that in other countries. *The royal seats are not national.* For this reason restoration does not go on according to a large liberal insight as to what is of the first importance: it goes on unsystematically, according to a family feeling of what may conduce to its distinction. If it were otherwise, if national funds were contributed to the restoration of what is intrinsically precious, not the public. The gilded iron balcony above the portal of the Royal Castle in Berlin was used as a "stump" by Fredrick William IV, from which to harangue the revolutionary crowds that threatened to destroy the monarchical throne, in 1848. And similar services, of bringing the inmates of palaces face to face with the populace, have been performed by most of the lowly-situated balconies on princely seats. The long balconies that run along the court-yard fronts of palaces, as in Figure 67, served as an outside corridor, as has been mentioned, and distinguish genuine old palaces from modern copies.

A fifth feature of palace façades is in some cases the windows: not in all, however. In Romanesque burgs they are commonly arched and the two lights of which they consist are separated by a small column. But these burgs are naturally few in number. Gothic castle palaces have insignificant windows, being as a rule mere rectangular holes in the façade — in a few cases, arched holes without mouldings. Occasionally they are grouped in pairs with a stone post between them, and are adorned with a plain section of an arch built in the masonry above. Of this style are the ancient windows of Castle Neüenstein, Figure 58.

Most old castles have windows of various styles, dating from the different renovations which they have undergone, and the small, Gothic ones are to be found left only in obscure parts of the palace, those of the *salons* and chambers having always been enlarged, at some period or another, in order to let in more light and sunshine. Thus, while the majority of the windows in the Albrechtsburg and Hartenfels castles are windows of the transition period, half Gothic,

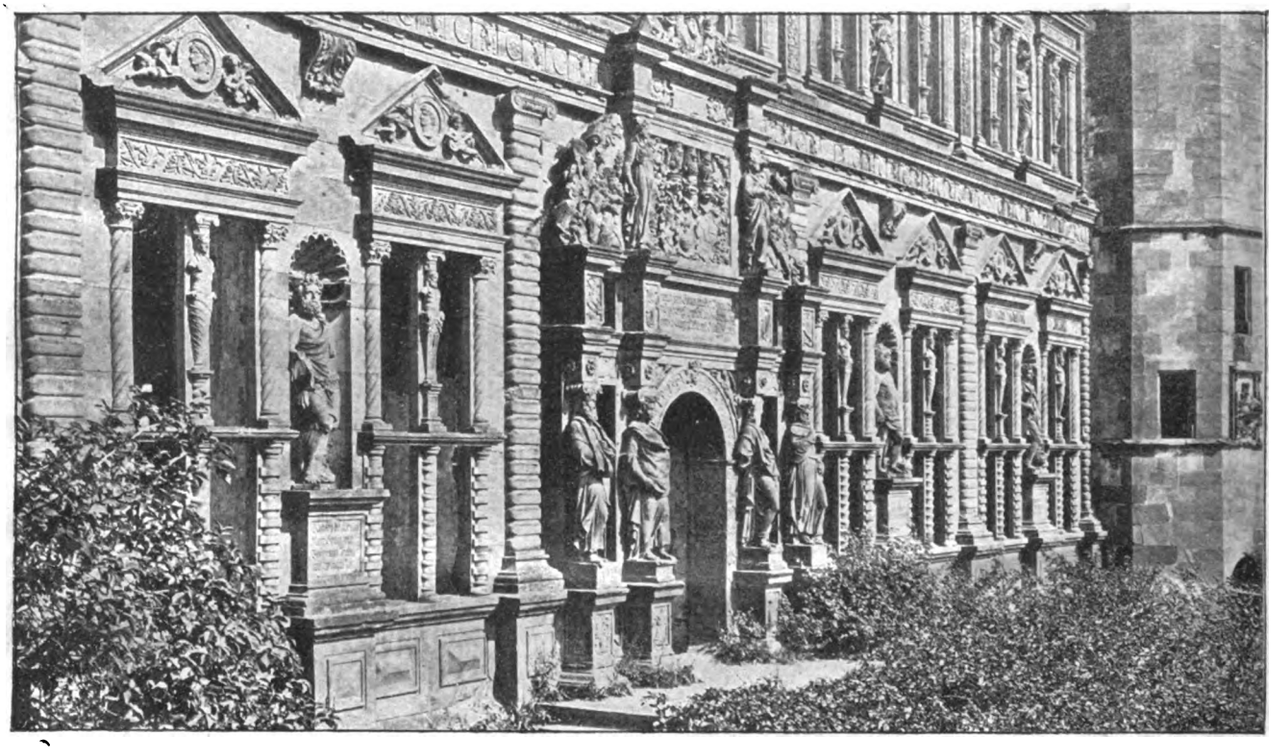


Fig. 69. Otto Heinrich Building, Heidelberg Castle.

hereditarily so, then Heidelberg Castle, then Würzburg, then Castle Hartenfels would be made to appear in the splendor that once clothed them, inside and out.

But to go back to our subject, the exterior members that adorn the façades of German palaces.

As a rule, balconies are not rare, but they are inconspicuous. The exceptions to the rule are two: the first being in the case of the earliest, and the second, of the latest (rococo) period of building. In the first, they are covered, and are less balconies than galleries proper. In the second, or in the case of low, one-story palaces, they are wanting altogether. There was no need for them, no possibility of their finding a foothold on the building. The office of the balcony was to facilitate communication from one point to another on the outside of a wall; so, naturally, the early balconies are attached to the *burgfrieds* or keeps.

In palaces of the fourteenth and fifteenth centuries they are extended along the court-yard front, and are supported by the projecting beam ends of floors or by stone or wooden corbels. A common form in castles of the early Renaissance is that of the Italian loggia; a *motif* adopted from Italy; that is, galleries one above the other supported by columns (see Fig. 36, the court-yard façade of the Dresden Castle). Nearly always they were perched very high on old castles, and according to my reckoning they were five centuries in descending to the first story. Like so many other architectural bits, their history is an epitome of the history of society; their descent, a symbol of the descent of princes from their lofty, divine position far above the masses to a closer proximity to the street and

half-Renaissance in style (See Fig. 67), I found several in the corner to the right of the staircase-tower in Albrechtsburg, of the ancient "step-window" form, a form for which I have a profound interest because of a notion I entertain that it is the origin of a singular German custom of building the seat of the *hausfrau* on a platform at a window — a custom I do not know how else to account for. Certainly it was not to elevate her symbolically that the steps are constructed. Such an elevation of woman was not in accordance with German practice. And the dais was for the lord of the house, and at the *end* of the *saal*, while these *hausfrau* windows are in the sides of rooms. No; originally the step-window was an outcome of early military construction, as we know from the examples of them which are found abundantly in ruins of the twelfth and thirteenth centuries, as Figure 68, which is a drawing of a loop-hole step-window from the keep of Castle Liebenzell. And by the force of tradition they held their own, down through centuries, during which long course of time the *hausfrau* and her maidens learned their usefulness in lifting them very near the light when sewing and stitching. Windows, we must remember, were built high above the floor down to the last century. And hence, while the step-window lost its usefulness for defence comparatively early, it long retained it as a good spot to work in. And when the stone steps ceased to be constructed between the window-jambs, wooden ones took their place outside the jambs.

For the rest, the peculiar arch form of the windows in Hartenfels is worthy of notice. It is the invention of Arnold of Westphalia, the builder of Albrechtsburg, who died in 1481, and was copied by

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the architects of the elder (Gothic) portion of the Royal Castle in Berlin.

Where windows appear in elaborate framing, as a decorative part of German façades, then the palace is either late Renaissance in

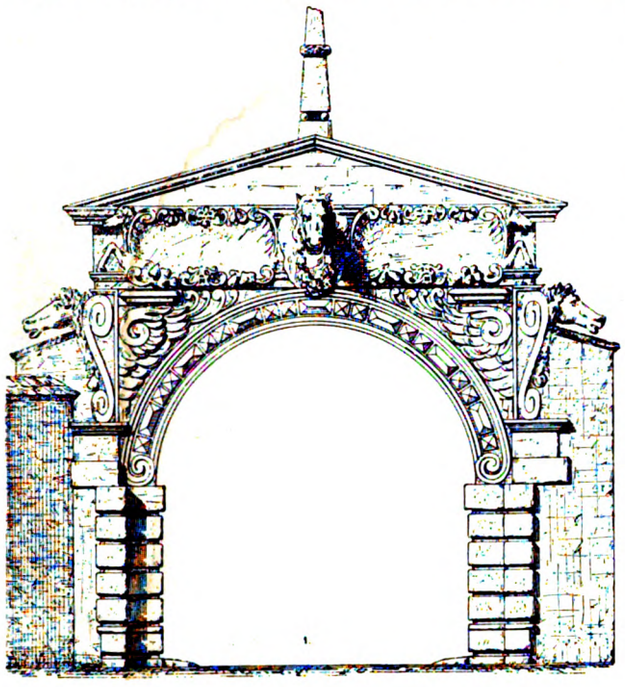


Fig. 71. Gateway: Castle Hartenfels, Torgau.

date or modern. The most famous castle windows in Germany, from an architectural point-of-view, are those on the court façade of Otto Heinrich's palace in Heidelberg castle. (See Fig. 69.)

Doorways are more frequently elaborated than windows. Sometimes you find nothing else in a palace façade worth looking at. Stress was laid on having handsome portals down through every period of castle-building in Germany to our own days, except in the

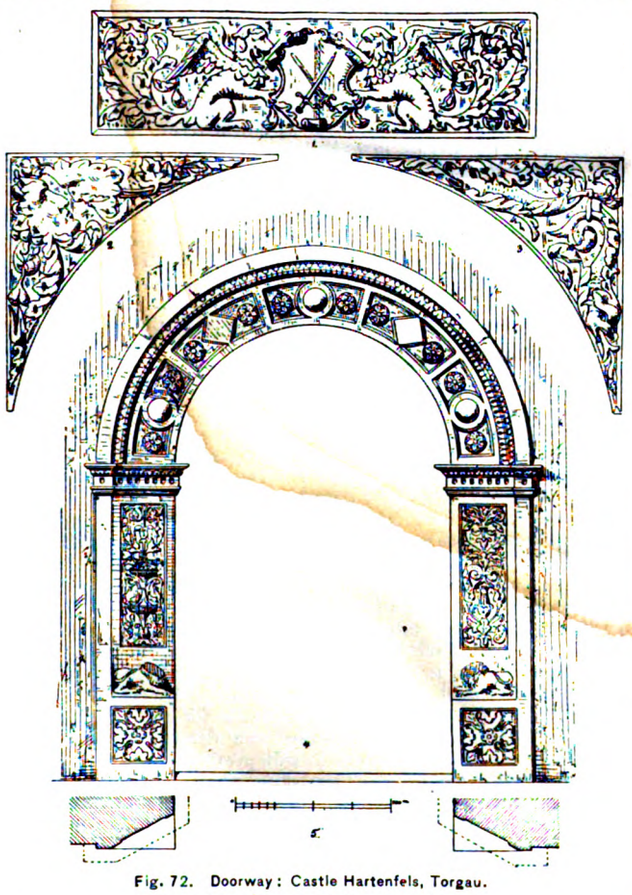


Fig. 72. Doorway: Castle Hartenfels, Torgau.

cases where princes built *à la rococo*, and even in such cases portals were not so much objects of neglect as of emulation.

Extremely few portals display bright coloring, and those few are modern restorations or outright imitations of Gothic doors. As a rule, doorways are made to depend upon their sculptures for beauty, these sculptures being shallow, scratched work or very flat reliefs in doorways of the early period of the Renaissance; or high reliefs in vegetable patterns in doorways of the middle period of the Renaissance, and of arabesques and so-called scroll and metal patterns in those of late Renaissance. Doorways of the past two hundred years are recognized by their motley construction and decoration as well as by their great height. All through the Renaissance, German architects designed low doorways. The frame of the famous portal of Otto Heinrich's palace in Heidelberg Castle is lofty, the top piece resting on the moulding that divides the first story from the ground-floor, but the doorway itself is much lower than the windows. (See Fig. 69.) And this lowness is the rule in genuine old palace-portals. As a rule, too, palace doorways are not deep. The exterior jambs are a great deal narrower than the walls in which they are set; see the portal of Heidelberg Castle, illustrated in Figure 69, and the portal of Hartenfels Castle, in Figure 70. Figure 71 is a cleverly-designed sally door in the last-mentioned castle, now used for the passage of horses to their bathing place in the Elbe River; while Figure 72 is a second example of the *palace* doorways in the castle. A comparison between the four specimens of portals in this one castle — the chapel doorway, Figure 66, the palace doorways

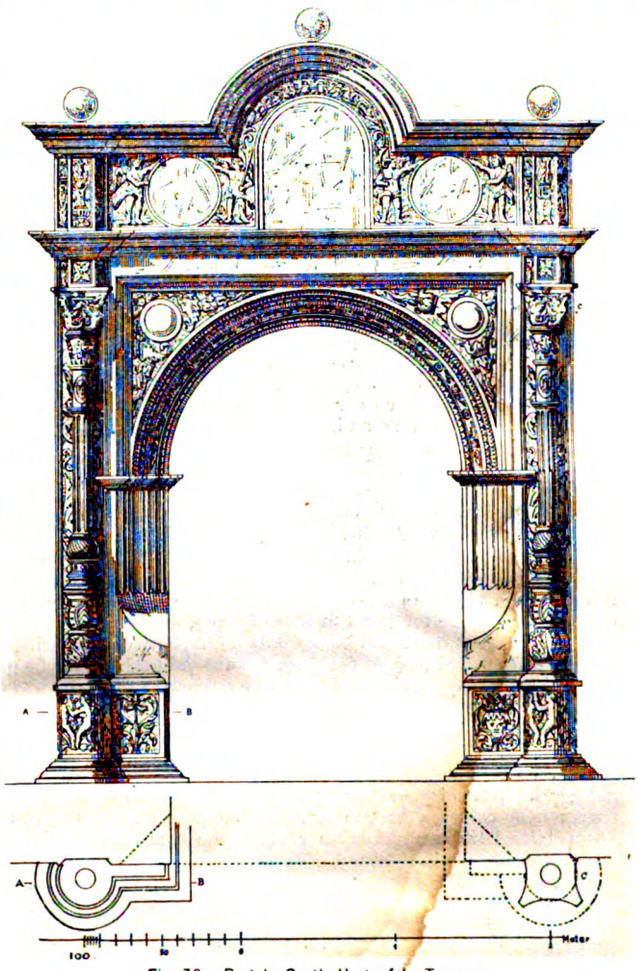


Fig. 70. Portal: Castle Hartenfels, Torgau.

illustrated in Figures 70 and 72, and the sally *porte*, Figure 71, will exhibit another and the last fact about old German castle doors, the fact, namely, that they vary in date and style. It is only in modern palaces that portals are few in number, and are lofty and deep.

L. VON KROCKOW.



NEW BUILDINGS, STATUES AND OTHER IMPROVEMENTS IN THE SEVERAL CITY PARKS. — THE ART INSTITUTE AND ITS WORK. — THE POST-OFFICE PROBLEM.

EVEN amid the unusual quiet in building-matters that prevailed before the election, several large buildings were going forward, which gave an occasional busy appearance to certain districts. On the site of the old Grand Pacific Hotel, the Illinois Trust and

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Savings Bank is putting up its curious two-story building, fashioned somewhat after the Bank of England, and which has before been spoken of in these letters. The Trade Building is now nearing completion, as well as that known as the Stewart. Numerous large apartment-houses are also on the boards or in process of construction and the naturally numerous smaller buildings make a goodly number, though as compared with that of former years, or with the number of architects' offices in the city, the total seems distressingly small.

In the City Parks, however, a greater number of improvements of an architectural or semi-architectural nature have been going on. Some are of recent date, while some have been in existence for some time. An interesting feature in Douglas Park, in the southwestern part of the city, is the new gymnasium and natatorium, which has only recently been dedicated. It is the first free resort of its kind ever built in the West, and, if one could judge by the enthusiasm which was evinced by the youngsters one cold afternoon this month, as they hung and swung on the trapezes and generally shook the kinks out of their little bodies, it will prove a most useful and beneficial thing to the people in that vicinity. The building is over three hundred by one hundred feet and the general plan of it is four corner pavilions connected on the east and west sides by long colonnaded verandas, the one on the front or eastern side being broken by two small central pavilions. The interior court thus formed is divided into two parts and contains swimming-pools, one for the men and one for the women. The men's pool is considerably larger than the women's, the former being 120′ x 60′, while the latter is only 60′ x 60′. Both are open above, and vary in depth from 3 to 8 feet. Seventy-five dressing-rooms surround the pool for women and 120 are placed around the other one for men and boys. Directly west of the natatorium courts the gymnasium grounds are being laid out, the Park Board having purchased a full equipment for all sorts of athletic games. At the west of the natatorium and overlooking these grounds is a broad piazza, from which the games can be viewed. The material of the structure is light reddish brick, with gray stone trimmings and red tile roof. The long eastern veranda, which is of wood with not entirely satisfactory wooden columns, is painted a cold gray to match the stone used in the building, and with the present rough surrounding of the place does not present a pleasing color-scheme. However, when it is set off by green grass, rather than, as it is at present, encircled by rough plowed earth, it will doubtless appear better. The corner pavilions are the only architectural features of the building and, being two stories, give the effect of greater height to the whole composition.

The western parks in our city seem to be, in the matter of providing chances for athletic amusement for the people, in advance of those in other parts of the city. Garfield Park, the pleasure-ground midway between Humboldt and Douglas Parks, has just finished a very successful bicycle track. In view of the fact that there seems to be in the average man or boy a superfluous amount of energy that has to be worked off in bicycle speeding, it has been considered wise to set aside a place for just this sort of thing, and to make the place so attractive that there will be not only no objection to its being confined to this special part of the park but the preference will be given to it. In this way more freedom will be gained in the driveways for people who do not care or are not able to rush things so. The track is located in a sixty-acre tract of land, in which there has this year been extensive improvements aside from those for the wheeling interests. The track is 18 inches from the pole and one-half mile in length. Blue clay was used for the foundation and banking of the track; next comes a certain grade of cinders, which when crushed down by rollers are ready to receive the concrete, consisting of crushed granite and Portland cement. A subway affords admission to the course and is in itself quite an architectural feature, built of buff Bedford stone, with some ornamental details and carving on it. A race-course for horses will surround the cycling track, and a field prepared for base-ball and foot-ball will occupy the central portion.

Not connected with the amusement features of the park system, a new building has been erected in Humboldt Park, that is unusually successful in character. This is what is known as the Receptory, designed by Frohman & Jepsen. The building is 163 feet long by 563 feet wide and incloses an open court. Sheds surround the court on the interior for the storing of wagons and vehicles used around the parks; toilet-rooms, the superintendent's office, storage-rooms and a carpenter's shop will occupy chiefly the space in the building. Few buildings in this part of the country can compare with it in general picturesqueness of outline and the success with which the color-scheme is carried out. The building, which is entirely old German in feeling, is most excellently designed, and in detail as well as general effect is extremely successful. The foundation is of rough boulders, as well as the trimmings of some of the arches, and the balustrades to uncovered porches and steps. The material above is red brick, while the second story, when such story occurs, is of open-timber construction, the umber-stained wood contrasting well with the pinkish brick, which is here used, and the light-red tile roof. One curious feature in the color-scheme is the introducing of blue lining on the woodwork, but unusual as it may sound, the effect is very good, giving only a mellowing effect at a distance, and not being too striking near to. The inner court is reached through an arched driveway, which is closed by some iron gates of most excellent design and workmanship.

In Humboldt Park a German spirit seems to prevail, perhaps out of regard to the man whose name it bears and whose statue stands on one of the principal drives. The "Humboldt" is by Gorling, both base and statue being considerably above the average in point of excellence. Humboldt stands in front of a tree-trunk with a globe by his side, and a plant in his hand. The modelling of the lower part of the figure is not all that could be desired, but the upper part and head are excellent. The design of the pedestal is good, though a little weakened by the upper member, which does not seem to harmonize with the whole.

Not far from this another statue has been raised to another German, Fritz Reuter, the Platt Deutsch poet. The sculptor was Franz Engelsmann. This is nothing very recent, but its many excellent points attract the attention of the passer-by; but the pedestal, although evidently designed by an architect, is unworthy the work placed upon it. The proportions of the pedestal are bad, but on a close examination one's entire attention is absorbed by the charming little bas-reliefs which have been introduced into it. Two of the reliefs are exceptionally good, one where an old man, a wig-maker, perhaps, is showing two children a wig, and the second, some convivial souls sitting in front of the village tavern, both subjects being presumably scenes from some of the poet's works. A less successful bas-relief is on the eastern side, while a bronze tablet to Reuter, bearing an inscription in Platt Deutsch, apparently to the effect that if a man has done his best he has done all he can, fills the fourth space. The bronze figure of the poet which surmounts the whole lacks originality of pose, but is strongly modelled about the head and shoulders and good in drawing. Especially successful is the head, of unmistakable German characteristics. A stump of a tree serves the poet for a possible prop in his long watch, a feature which is introduced as an accessory into several of the statues in the parks, especially in those from the hands of German sculptors. A tree-stump does not seem from an artistic standpoint to be the most desirable object for a composition, as it smacks too much of the iron dog and stag style of statuary.

Lincoln Park has lately been the recipient of two most excellent statues, "Hans Christian Andersen," presented by the Hans Christian Andersen Society, composed of Danes all over the Union, and "Benjamin Franklin," given by Mr. Joseph Medill to the printers of the city.

The statue of Andersen, by Johannes Gelert, is very satisfactory. The gentle story-teller also sits on a stump, pen in hand, while the arm that holds it rests on a book. The "ugly duckling," now grown to be a swan, nestles by his side. The pose of the whole figure is good and free, and the kind, homely face is full of character and strength. Mr. Gelert can well feel that he has placed in the park a figure that will be a real delight to many, and a living creation to still others to whom Hans Christian Andersen has been a real friend from the days when they learned through him "What the moon saw," till the "Improvisatore" took them to the city of the seven hills.

Lacking, perhaps, in picturesque setting and sentiment, the "Benjamin Franklin" might not be judged to fall far short from an artistic standpoint. Straightforward of mien, with head slightly bent forward, our Colonial philosopher looks down with the same kindly gaze of brotherly love with which he looked at the old Quakers in the streets of Philadelphia over a hundred years ago, or on the gay Parisians in the capital of France. The sculptor, Mr. R. H. Park, has especially caught the strong spirit of gentleness which was so striking a characteristic of the old printer.

A very picturesque feature in this most beautiful of all the parks is the new boat-house, now nearing completion. It is most favorably situated at the northern head of the most northern lake, which from this point has a pretty stretch southward. To the east rises a low hill covered with stunted pines, while at the west the house is built directly into the side of another little rise. The materials are boulders for the foundation, red bricks of a rather rough variety laid in white mortar for the side walls, and red Conosera tile for the roof. The effect is that of a broad, low building, the basement with its arched openings on the water side giving an especially picturesque effect. The roof with its red tile is broad-eaved and gabled, and a good feature of the building, if one's symmetrical eye is not harrowed by the crooked lines which the tiles pursue across the broad expanse. These waves and inundations in the tile would seem to indicate a certain indulgence on the part of the superintendent of the building, not altogether desirable. However, the building is eminently satisfactory, and decidedly puts to shame the old wooden structures formerly erected in the parks for similar purposes.

South Park, too, boasts a new boat-house, which is said to rival that of Lincoln Park in beauty and convenience.

Lincoln Park is also to have a new animal-house, the present quarters having become too cramped for the creatures, who have multiplied in a manner quite surprising for animals living in captivity. The plans have already been drawn by Mr. J. Lyman Silsbee, though lack of money will prevent the completion of the entire building at once. The house, which is to be built against a small hill, as a protection for the animals against the north and northeast wind, will have for its shape the three sides of an octagon. The approximate size will be about 400 feet by 50 feet, though the building will not consist of one large building, but practically will be composed of several low pavilions, connected by walls or colonnades. It is planned that the material shall be either boulders or rock-faced stone with a roof of red tile. A central room, of generous proportions and facing the south, is destined to be the home of the carnivorous animals. Next, on the east, will come an aquarium, with the

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elephants for neighbors, next door. There will also be a "lodging-house" for such circus animals as their owners are glad to lend to the park for the winter. Double cages are planned for the animals, which will much lighten the care of the keepers, as the changing from the fall to the spring cages is always dangerous and troublesome work. The two cages will be placed back to back, and in summer the animals will occupy the ones facing outward, while in winter they will occupy the inside cages. The aquarium, which will be fitted up on a plan similar to those at the World's Fair, will be something new at the Park, and if one can judge from the popularity of the one at the Exposition, will prove a great attraction. One excellent feature of the proposed building will be that the passages will be so arranged that the crowd can enter the building, pass entirely through and find an exit at the end. The dreadful ventilation of the former building will be improved upon by means of automatic fans.

Apropos of the improvements in Lincoln Park, one is led to inquire what has become of the monumental entrance, the competitive drawings for which were on exhibition and were mentioned in these letters.

A statue, which is to be given to the Lake-front Park, will, if it fulfil its promises, be an excellent piece of work and prove a relief to one's feelings on the score of the "Columbus," of unenviable reputation. This statue will be a monument to General John A. Logan and will be placed midway between Michigan Avenue and the Illinois Central tracks, at a point directly opposite Hubbard Court. As the site is good and the sculptor Augustus St. Gaudens, it goes almost without saying that the result will be something fine. The original site was one set apart in Jackson Park, but it was found that when Mr. Olmsted's plans in regard to that pleasure-ground should be carried-out, this site would be unfavorable and, consequently, the place was changed to the Lake-front. In a recent conference between the commissioners, Mrs. Logan and Mr. St. Gaudens, it was decided that the base of the monument, a granite structure 20 feet in height, should rest on a mound 30 to 40 feet high with a diameter 200 feet across. Mr. St. Gaudens has completed his model, which is that of an equestrian figure of heroic size. He expects soon to turn it over to the founders and it is assured the statue will be ready for dedication next summer. It is interesting to notice that much good casting is beginning to be done here in the West, the "Hans Christian Andersen," mentioned above, being an example of Western skill.

Another interesting feature which the Lake-front has in prospect, will be the house of the Illinois Naval Reserve, to be located at the foot of the Randolph Street viaduct. Though an inexpensive building, it will not be without a certain picturesque element, if one can judge from the cuts of it already published. The plan is to drive a row of piles 40 feet east of the sea-wall and parallel to it. Between this outer row and the sea-wall a second set will be driven down, and on top of these piles, which will be the same height as the sea-wall, the foundations of the structure will be laid. The house will be of one story with a covered gallery and tower on the roof. The boats will enter the structure through ten arched openings on the Lake side of the building, will be hoisted above the reach of the waves after entering the place and the openings will be closed by a lattice-work. But while talking of prospective glory of the Lake-front it should be stated that all plans pale before the possible scheme for the beautifying of the place itself. D. H. Burnham has recently brought forth an "idea," compared with which the former conceptions are but as motes on the eye to spots on the sun. The idea seems to be to take in the greater part of the outer harbor, as recently designed and finished by the Government.

Mr. Burnham says: "The building-lots and the streets that lie against the Illinois Central Railway on the west will each have extensive views of the lagoon and of Lake Michigan itself.

"The Illinois Central Railway banks will be planted at intervals with fruit trees, flowering shrubs and bright foliage plants. . This plantation will slope gently into the lagoon from the level of the rails. The waters of the lagoon will be maintained at a given level, so that the finest and most delicate effects of aquatic growth can be maintained. Not only are the broad sweeps of the lagoon and of the Lake itself to be left open from the railway and shore dwellings, but also the water pageants and illuminations, summer and winter, will be visible, both those that occur by day and those that occur by night; all noiseless, but enchanting to see.

"From the above, the first object of Mr. Ellsworth in proposing the shore drive will be appreciated, namely: The realization of fairyland to those now living on the border of the Lake, and the passing to and fro by the suburban trains.

"Houses may be placed at long intervals apart on the green, between the lagoon and the shore drive, and their principal fronts will be towards the lagoon, of course. There will be no barns as such. There will be no walls or hedges running beside the railway or the lagoon. The prospect will be open in all directions and will be made as beautiful as human fancy can make it."

On the strength of such a description, which accompanied a cut of the proposed park and drive, one feels that an announcement is not without force which is made by the Art Institute, in its partial prospectus for 1896-7, that Daniel H. Burnham will, on December 15th, lecture on "The Lake Shore," such lecture to be illustrated by plans and drawings.

This programme for part of the lecture-work for the coming year is most interesting, and not least noticeable is a University-Extension course of lectures on subjects relative to art, to be given every Monday evening, at which time the galleries will be open, a thing not heretofore done in the evening.

The seventeenth annual report of the Institute has just been published and, as has been the case for several years, shows a growth and advance in the affairs of the institution. The report shows evidence of a year of hard times, for the gifts to the museum and school have been most modest as compared with those of other years.

It is a curious fact that about the middle of last month, before the designs for the new post-office here had been formally accepted by the Government, plans and elevation of the structure were published in nearly all of the daily papers. This was done, so said Mr. Cobb, to invite friendly and beneficial criticism; but if that was the object, the publication was a total failure, as it did not call forth any criticism whatever, except in the case of one paper, which interviewed several of the prominent architects on the subject. The drawings were entirely too preliminary for serious criticism, and this fact alone, if other reasons had not existed, would have deterred architects from giving opinions in anything but a spirit of half raillery.

The building is designed on Classic lines, so far as is possible for such a commercial structure, while a large ribbed dome, very similar in character to that of the Administration Building at the World's Fair, will crown the whole structure. The material is to be a light dressed granite and the dome will be gilded. The scheme is to cover the entire square on which the old Post-office formerly stood, to a height of two stories. These are to be surmounted in the central portion by a six-storied structure built in the form of a Greek cross, while above this is to rise the dome before alluded to. Entrances will be on all four sides of the building, all similar in character, except that on the Clark Street side there are to be two wagon-entrances at each side of the regular entrance.

The tearing-down of the old Post-office progresses very slowly, and if it is true as reported, that the work is contracted to be finished by the fifteenth of next month, a good deal more speed will have to be shown than heretofore in the work.

SOCIETIES

SKETCH-CLUB OF NEW YORK.

THE regular monthly meeting of the Sketch-Club of New York was held Saturday evening, November 7, 1896.

The President, Mr. J. Oliver Cummings, occupied the chair.

The attendance at this meeting was much smaller than usual, owing to a misunderstanding which delayed the mailing of notices.

The guest of the evening was Mr. Bruce Price, who after the dinner favored the Club with an address on the necessity of a thorough knowledge of the graceful lines and perfect proportion of the human form, and the application of color to exterior work. Mr. Price's suggestions were the result of a great deal of study and though his address was short, it was very instructive and well-appreciated.

Mr. Sconce, Vice-President, following Mr. Price, made a few timely remarks reminding the members that the advice which they had just received could best be carried out by attending one or more of the Life Classes which were being conducted so successfully under the leadership of Mr. Nolan, and the Water-color Classes under Mr. Robert Adams.

Those entering the Pen-and-ink Classes will be supplied with outline sketches especially reproduced for them, which they will render under the direction of Mr. J. J. McGinnis.

The announcement was made that the Class in Architectural Research would meet in the Club-rooms, Saturday evening, November 14th, when Mr. Partridge, who is directing the class, will be present.

Meeting adjourned 11.15 P. M.

HARRY P. KNOWLES, *Recording Secretary.*

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

FOUR COMPETITIVE DESIGNS FOR THE CASE MEMORIAL LIBRARY, AUBURN, N. Y. SUBMITTED BY MESSRS. E. A. KENT, BUFFALO, N. Y.; O. OSTERBURG, NEW YORK, N. Y.; J. L. FAXON, BOSTON, MASS., AND H. A. WALKER, NEW YORK, N. Y.

[Issued with the International and Imperial Editions only.]

BUILDING FOR THE YOUNG MEN'S CHRISTIAN ASSOCIATION, MADRAS, INDIA. MESSRS. MERRILL & CUTLER, ARCHITECTS, LOWELL, MASS.

SOME of the conditions peculiar to Madras and Southern India call for a few notes of explanation. The city is very near the level of the sea, and during the monsoons the streets are often overflowed to the depth of two or three feet near the water-front.

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There are no sewers, the drainage being all on the surface in the street gutters. The building is to be constructed of brick, with stone dressings. The ground-floors are paved with concrete and tiles laid directly on the concrete. The other floors and roof are laid with two thicknesses of brick tiles, laid diagonally on wood-joists (which are exposed underneath) and finished on top with cement, tiles or mosaic. All partitions are of masonry, wood connections between the ground-floor and woodwork of floors above are avoided, on account of the ravages of the white ant. Indirect light through porches and verandas, high-studded rooms with the windows extending to near the ceiling, are necessary, owing to the excessive heat which exists during the entire year.

Baths for public use are either sprinkling or shower, owing to the different castes of the people, and the large number who are diseased. Water-closets are not used, for want of drainage, buckets being used in their place and the soil is daily removed by native servants, external or separate stairs being generally provided for their use.

ZION REFORMED CHURCH, YORK, PA. MR. B. F. WILLIS, ARCHITECT, YORK, PA.

ACCEPTED DESIGN FOR THE DALLAS FLATS, DALLAS, TEX. MR. J. RIELY GORDON, ARCHITECT, SAN ANTONIO, TEX.

HOUSE OF J. A. HANLEY, ESQ., CLAYTON, MO. MR. F. C. BONSACK, ARCHITECT, ST. LOUIS, MO.

TWO HOUSES FOR THE NEWTON LAND CO., NEWTONVILLE, MASS. MR. S. J. BROWN, ARCHITECT, BOSTON, MASS.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NOS. XXXV AND XXXVI: THE ROMAN BATHS, NIMES, FRANCE.

WROUGHT-METAL GATE.

[Additional Illustrations in the International Edition.]

DETAILS FROM THE NEW YORK CLEARING HOUSE, NEW YORK, N. Y. MR. R. W. GIBSON, ARCHITECT, NEW YORK, N. Y.: TWO PLATES.

[Gelatine Print.]

MAIN ENTRANCE TO THE RATHHAUS, WITTENBERG, SAXONY.

[Gelatine Print.]

The architect of this building, which was erected in 1573 and was restored in 1868, is now unknown.

CASA DEL VALLONE, BORDIGHERA, ITALY. MR. WILLIAM SCOTT, ARCHITECT.

COMMUNICATIONS

[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

PAYMENT FOR REJECTED PRELIMINARY WORK.

HOUSTON, TEXAS, November 7, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Kindly express an opinion on the following, as to the usual and customary charges pertaining to commissions:

An architect was engaged to furnish plans and specifications for a residence to cost $10,000, the owner giving his views as to the amount of room that was required, general arrangement and style of finish, etc. The plans and specifications were finished to suit the owner, bids taken and it was found that the bids ran about $15,000. The specifications were then changed, cheaper material substituted and bids again taken, which brought house down to $12,000. This was yet too high to suit the owner and an entirely different set of plans and specifications was made, the house was built according to these and the architect paid 5 per cent for his services on the cost of the house as erected. Now the architect and the owner had a verbal understanding that if the house was not built, the architect was to receive 2½ per cent for his trouble in making the plans and specifications, and if built to receive 5 per cent, as usual and customary.

The architect claims that he is entitled to an additional 2½ per cent for the first set of plans and specifications made, but is only charging the owner 1 per cent. This the owner does not object to pay, but he wishes to know what is usual and customary in such cases.

Very truly yours, O. LOREHN.

[It is quite possible that there were circumstances which, under the "verbal understanding," would entitle our correspondent to expect and exact some compensation for the first set of drawings, but hardly as much as 2½ per cent under any probable conditions. An architect is expected to know enough about his business to be able to do one of two things when a client places work in his hands: either to explain to his client that the building under the stated requirements cannot be built for the sum named — in which case the architect, if required to make the attempt, can protect himself by effecting a specific contract for payment for work which he knows will be useless; or else to be able to so design his building as to so nearly meet the conditions of requirement and cost that the expense of modifying it could not possibly become a matter for an extra charge. In such cases as this, we usually advise the computing of a fair *per diem* charge for the discarded service. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

REPAIRING THE PARTHENON. — The works necessary for the immediate reparation of the Parthenon, in order to secure it against such contingencies as might arise, are not neglected. M. Magne and Mr. Penrose, in coöperation with Professor Josef Durm, the Oberbaudirector in Karlsruhe, have made arrangements for commencing operations. The weakest part of the temple is the architrave, which was shattered by the recent movement of the site, and on that part attention is concentrated. A scaffolding of American pine, which will extend the whole length of the peristyle of the opisthodomus, has been constructed, the work occupying a couple of months. A travelling crane was also obtained from Düsseldorf, which will run on two longitudinal pine balks, measuring 12 inches by 12 inches. Marble blocks from the Pentelic quarries are on the spot, and six clever masons are employed in preparing the stone. With a substantial scaffold to work on, all the difficulty of dealing with the injured masonry will be minimized, the men will be near their work and have a firm footing. They cannot by any accident in their operations increase the damage by pulling down fragments. There is careful superintendence, and we may be confident that not one cubic inch of new stone will be introduced which can be avoided. — *The Architect.*

STREET PAVING AND CLEANING IN BIRMINGHAM. — Most of the two hundred and fifty-seven miles of streets are paved with macadam varying from 6 to 18 inches in depth. It is well adapted for the less crowded residence districts, although somewhat costly to maintain. In the business quarter stone blocks are used, their average life being twenty-five years. This is done by the Public Works Committee, with laborers working by the day or week. Other streets in the same quarter are paved with wood blocks, insuring greater freedom from noise and more cleanliness. This is laid by contract, and is supposed to have an average life of fourteen years. Whatever material is used, the streets are kept in the best repair. Street-cleaning gangs meet in the business quarter at five o'clock each morning, sweep up and cart away the accumulated dirt, and water the streets before and after the operation, until those laid with wood look as if they had been carefully scrubbed. They are also kept clear of litter during the day. In residence districts they are swept once, twice or three times a week, as required. As a result, they are everywhere kept so clean as to cause surprise. It cannot, however, be said that the foot-paths are so well kept, the practice of every man sweeping before his own door not being common, except for the removal of snow. — *George F. Parker in the November Century.*

A CAST-IRON FOUNDATION. — A new way of constructing a solid foundation for a tall building has been tried with success in Berlin. It was necessary to find a solid base sufficiently strong to carry a building weighing more than ten thousand tons. The plot of ground upon which the building was to stand was adjoined on both sides by high buildings which rendered unsafe the digging to any depth for a foundation. The only way out of the difficulty was the sinking of a caisson in the centre of the plot, upon the cemented top of which a hollow form of cement was built. Into this form molten iron was poured, filling up the space, and upon this cast-iron foundation-plate the understructure of the building now rests, while the side walls are supported by a cantilever structure. The full weight of the load upon the cast-iron foundation is estimated at more than twenty thousand tons. — *Boston Transcript.*

ANCIENT COPPER MINES. — The copper mines of Sinai, the most ancient mentioned in history, were the subject of a recent communication by M. Berthelot to the French Academy of Sciences. Authentic documents show that these mines were worked since the time of the Egyptian dynasty (about five thousand years B. C.) until the end of the Ramesseides (about 1300 to 1200 B. C.). While their possession was the object of several wars, they have been abandoned for three thousand years on account of the poor quality of the ores. From these mines came the sceptre of Pepi I, a king of the sixth dynasty, which is now preserved in the British Museum, and which Berthelot's analysis showed to be of pure copper. The adits still exist, as do ruins of the furnaces, the crucibles, the huts of the miners and fragments of their tools. — *Boston Transcript.*

S. J. PARKHILL & CO., Printers, Boston, U. S. A.

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NOVEMBER 28, 1896.

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IT is probable that two or three hundred young men, high-school pupils, freshmen in colleges or technical schools, or persons with somewhat undefined aspirations after the fine arts, are now, or will be soon, contemplating the advisability of directing their studies with the view of adopting architecture as their future profession, and it may be of advantage to them to correct some of the ridiculous notions about the practice of architecture which are disseminated by the newspapers. Among the small journalists, particularly, whose mouths water at the thought of any supposed "plum," strange notions are current in regard to the income of architects. Not long ago, an article went the rounds of the press, informing the public that a large number of architects, including the principal ones in all the more important cities, enjoyed incomes from their practice amounting to about fifty thousand dollars a year. This absurd statement has probably had the effect of turning hundreds of young men, who in some other business might have been happy and prosperous, to the study of a profession for which they have no aptitude, and which has no attraction for them beyond its supposed emoluments, and in which, unless they are wise enough to abandon it as soon as they see their mistake, they will spend a life of discomfort, privation and regret. The fact is that architecture is now not only a crowded profession, in which such employment as there is must be shared among a great many competent persons, but the work required of an architect is far more detailed than ever before. Unlike a lawyer, who, if he is employed for important interests, may often get a ten-thousand-dollar fee for half an hour's work, without any outlay whatever, an architect entrusted with a large commission must employ many draughtsmen, pay heavy office expenses, and, very probably, expend a large amount of money in consulting specialists, during two or three years, in order to get his work done, and the share of his five per cent commission which remains to him at the end of the transaction is a very small one. In many cases it is a minus quantity, for hundreds of commissions for fussy clients are carried out by architects at an actual loss, even allowing nothing for their own time and skill. Moreover, in the case of large commissions, the outlay usually increases in a greater ratio than the receipts, while a tolerable capital is necessary to furnish the money required to meet the office expenses until payments on account of commission are due. Many an architect with a large practice has an average income less than that of his principal draughtsman, and he incurs grave pecuniary responsibilities from which his assistants are free. We should be sorry to deter any one with a sincere love of the art, and sufficient application to master it thoroughly, from devoting himself to the practice of architecture, but if any youth, or any parent, imagines that this profession furnishes an opportunity for making more money, with less labor or risk, than others, he had better make inquiries of those who have tried it.

ONE effect of the elevator-accident in the American Tract Society Building in New York has been to call attention to the inconveniences, not to say defects, of the system of using very high pressures in the cylinders of hydraulic elevators. Most of our professional readers know that the reputation of hydraulic passenger-elevators was made with machines employing a cylinder-pressure varying from one hundred pounds to about one hundred and fifty pounds to the square inch. These elevators were so smooth in operation, so economical and safe, that they had practically superseded all other machines for passenger service, when the electric-elevator, after many trials and improvements, began to compete with them. The builders of hydraulic elevators, partly to meet this new competition, and partly to save space in the high office-buildings, in which the room occupied by the elevator-plant is a serious item, designed systems in which small cylinders and tanks could be used, increasing the pressure to compensate for the loss in size. The first of these high-pressure plants was designed, if we recollect rightly, for a cylinder-pressure of about seven hundred and fifty pounds to the square inch. This has, so far as we know, worked successfully for several years, and more recent ones have carried still higher strains. The normal cylinder-pressure in the American Tract Society's Building is said to have been one thousand pounds per square inch, but it is reported that there was a good deal of trouble about it, and that repairs were constantly necessary. To people who know much of building matters, this will not seem strange, for it is well known that in steam or water plants the strain on valves and other apparatus is far more destructive at high pressures; but it has hardly been realized before that this rapid deterioration might become dangerous to passengers using the elevators. Whether it will be possible to change the system, so that such delicate mechanisms as elevator valves can be safely operated under such enormous pressures, remains to be seen, but it seems not at all improbable that the occasion for the adoption of the system may be removed, by the abandonment of the practice of carrying buildings to immoderate heights.

DR. DÖRPFELD, in one of his recent lectures in this country, expressed the opinion that the latest archæological explorations in Greece, richly rewarded as they have been, instead of exhausting the field, have, as yet, barely made a beginning in the work of bringing to light what Greece has to offer in the way of archæological information. So far as the Classical period of Greece is concerned, Delphi, Olympia and the cities of Asia Minor have still much to show, but the greatest discoveries are probably to be made in the ruins of the prehistoric period, at Mycenæ, Argos, Medeia, Orchomenos, and other places. The remains of ancient Argos, which, according to the legend, was built by seven one-eyed giants from Asia, have hardly been touched, and, after the discovery of the body of Agamemnon amid the ashes of his palace at Mycenæ, it would be hard to say that the bones of Jason, if not, indeed, the talking prow of the Argo may not be exhumed in the more ancient city, which, even in historical times, showed the tomb of Ariadne. It seems to be settled that the inhabitants of Argolis at the Homeric period were ignorant of the use of writing, thus confirming the ancient tradition, that the poems of Homer were not written, but handed down by verbal repetition for many generations before they were committed to writing; and everything that can be learned about the people who have for three thousand years been regarded as demigods and heroes is doubly interesting, not only as an addition to the legends which have made Jason and Medea, Orpheus, Æsculapius, Theseus, Castor and Pollux, Admetus and Atalanta, and the other Argonauts, nearly as familiar to us as they were to the Roman youths two thousand years ago, and to the Greeks a thousand years earlier still, but as a contribution to the early history of the human race.

AFTER Mycenæ and Argos, Colchis, Crete and the Hyperborean land have been thoroughly explored, the skeleton of the Minotaur recovered and reconstructed, specimens of the dragon's teeth which failed to vegetate transferred from the soil of Colchis to the shelves of our museums, and the Golden Fleece electrotyped and exhibited in fac-simile in New

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York, steps should certainly be taken to investigate the relics of much more remote antiquity than that to which these objects belong which are within our reach. According to Dr. Dörpfeld, the Troy of Homer, before the walls of which the gods fought side by side with men, was the sixth city which had been built on the same site, five others having passed through their era of existence, from the time of their foundation to that of their desertion and decay, before the Troy which came to an end through the folly of Leda's daughter was founded. The town which succeeded Homer's Troy on the same site had a career of more than a thousand years' duration; and supposing those which preceded it to have flourished for about the same length of time, the earliest would date from about 7000 B. C. Dr. Hilprecht's researches in Mesopotamia show that it is quite probable that there may have been a coast city at that period in a situation so favorable as that of Troy, and the question is not now whether there could have been any civilization then, but what was the civilization which in all probability existed. How did people look, talk and behave six thousand years before the Trojan War? That is a subject on which we have already some light, and the more we learn about it, the more interesting it is likely to become.

THE death of Sir Benjamin Ward Richardson, better known as Dr. B. W. Richardson, removes from the world of hygiene and social science a very prominent figure. For some thirty years Dr. Richardson had devoted himself to the investigation of subjects of public interest, connected with the prevention of disease, and the preservation of health in the community, and his bright and earnest style of putting his observations into shape for publication was of great value in calling attention to them, and impressing them on the memory. Many people will remember his address before the Social Science Congress in 1875, describing the imaginary City of Hygeia, which called out, perhaps, more discussion than any other essay on social science ever published. Besides being a sanitarian of great accomplishments, he was an earnest friend of temperance and physical culture, and at the time of his death, although he was nearly seventy years old, was President of the Society of Cyclists, as well as of the Medical Society of London.

AT the recent Convention of the National Association of Building Inspectors, in Buffalo, a good deal was said, and undoubtedly with reason, about the unsatisfactory character of the relations between inspectors and architects. The speakers did not reproach the architects in the least, but only regretted a condition of affairs for which, as it seems to us, the architects are to a certain extent to blame. There is no question that the inspectors, without exception, simply try to the best of their ability to carry out the laws which it is their duty to enforce. It is quite possible that the laws may be in some respects unreasonable or oppressive, but the inspectors have not made the laws. Indeed, in some cases, the architects have had a good deal more to do with their composition than the inspectors, and they should be the last to complain if they find the enforcement inconvenient. Wherever inspectors are allowed any latitude in the interpretation of the statutes, we believe that they are always found reasonable and considerate, and architects who will show the same qualities are not likely to quarrel with them. Moreover, as architects will readily confess, the plans which they present for their permits very often show obvious violations of the building-laws, to which, of course, their attention must be called by official disapproval. Annoying as it is to the architect to have to modify his drawings, it would do no harm to remember that the trouble could almost always have been avoided by referring to the building-laws while they were being made, and that an overworked superintendent of plans has quite as much reason to grumble at being obliged to spend his time in noting defects due to pure inattention to the requirements of the statute on the part of the architect as the latter has to growl over delay and annoyance caused by oversights which might, perhaps, later, involve him in serious trouble if the inspector's timely warning did not enable him to remedy them. We are far from saying that the building-laws of our cities are all that they should be, and we think that too little discretion is given in them to architects and inspectors; but the best way to make them more elastic, less complicated, and easier of enforcement is to have the architects and inspectors work together for that end, instead of pulling at cross-purposes, as they are inclined to do now, to the great inconvenience of both.

M. CHARLES LUCAS, in his search for incidents relating to the great architects of the past, has come across some letters in the Memoirs of Saint-Simon about the younger Mansart. This great artist, whose family name was Hardouin, was the son of an obscure painter. He was, however, on his mother's side, grand-nephew of François Mansart, and the latter, taking a fancy to him, taught him drawing and construction, and found employment for him on the King's building work. On the death of the older Mansart, Jules Hardouin took his name, and succeeded to his favor with the King. The latter seems to have found him a judicious and useful person, for he not only made him a Royal Councillor and General Superintendent of the Royal Buildings, Gardens, Tapestries and Manufactures, but created him Count of Sagonne, Baron of Jouy, and Seigneur of various other places. To help him in his work, he took into partnership his brother-in-law, Robert de Cotte, who succeeded him as Architect to the King, and was himself succeeded by L'Assurance, who had for many years worked for Mansart and de Cotte as head draughtsman.

SO much prosperity excited the malignity of Saint-Simon, and it is not impossible that the King's dismissal of Villacerf, to put Hardouin-Mansart in his place, added to his spite, for in one of his letters, which M. Lucas quotes in *La Construction Moderne*, he describes Mansart as "a tall, handsome man, of the lowest origin, but with natural wit, which he used in such a way as to please those whom he met, but without being able to conceal the clownishness of his original condition." Saint-Simon says that he was only a mason's apprentice and stone-cutter before he succeeded in getting into the good graces of his grand-uncle, and that his advancement as an architect was due to his address in attracting the attention of the King and the great lords, and not to his skill in his profession, of which, as he says, he was quite ignorant. "De Cotte," says Saint-Simon, "knew no more of architecture than his brother-in-law, and they got their plans and designs from a draughtsman named L'Assurance, whom they kept, as far as they could, under lock and key." M. Lucas points out that these slanders of Saint-Simon in regard to Mansart and de Cotte have long been disproved. As for the Marquis of Villacerf, who was removed to make room for Mansart, it is a matter of history that he was forced to resign his post in consequence of the rascalities of his chief clerk, Mesmin, and the King simply appointed Mansart to the place thus made vacant. As to the talent or skill of Mansart and de Cotte, and of their successor, L'Assurance, their works, some of which still remain, testify sufficiently. Mansart's works are too well known to specify in detail; de Cotte, whom the King thought possessed of sufficient skill to be made Director of the Royal Academy of Architecture, was the designer of the Golden Gallery of the Bank of France, still in excellent condition, and completed the celebrated chapel at Versailles, while L'Assurance, whose real name was Cailleteau, built the house now occupied by the Austrian Embassy, and in connection with Girardini, began what is now the Palace of the Elysée, the residence of the President of France.

THE project for building a tunnel under the East River, from New York to Brooklyn, after going through many vicissitudes, has taken what appears to be its final shape, and work on it is to be commenced at once. The company which is to construct the tunnel represents mainly the surface lines of street cars, although the President, Mr. Henning, was formerly Vice-President and General Manager of the Long Island Railroad Company. The tunnel itself will be far down town, extending from the neighborhood of the City Hall, in New York, to a point near the stores of the Brooklyn Warehouse Company, a distance of forty-seven hundred feet, so that passengers who now cross the river by the Fulton ferries can be transported across without leaving their cars. A contract has been made with Messrs. Sooysmith & Co. for the whole of the construction, and it is supposed that the tunnel will be opened for traffic in about eight months.

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STABLES. — III.[1]

LOFT. — The usual custom is to build stables but one-story high with a pitch roof. This gives ample accommodation for the storage of hay and grain, besides allowing space for man's-room and for storage of sleighs during the summer time. There should be at least two gable ends in the loft, or, if conditions of design preclude such arrangement, there should be opportunity for ample cross ventilation and sufficient light. There should be an upper and under floor, the upper floor being matched and laid over a thickness of heavy building-paper to prevent the dust from sifting down through the floor. The stairs giving access to the loft are best taken from the carriage-room. They should never be taken directly from the stall-room. At least two bins for grain should be provided in some portion of the loft where the contents will empty by gravity towards the chutes leading into the stall-room. Each bin should have a capacity of about 50 bushels of grain. A bushel contains 2,150.42 cubic inches, or a trifle more than 1.2 cubic feet. Consequently, if the bins are made 3′ x 5′ x 3.6′, they will hold about 40 bushels each. This is assuming the bins are square-bottomed. The bottoms should, however, be sloped towards the centre with a rise of at least 6″ to the foot, and to make up for the loss, the bin had better be 3½′ x 6′, and 3′ 6″ deep in the centre. The bin should be constructed of matched ⅞″ boards and have hinged covers. If there is any liability of the stable being infested with rats, it is well to line the bins throughout with galvanized iron.

A hatchway is left in the floor over about the centre of the driving space of the carriage-room, this hatch being made 6′ square with double-hinged doors reinforced by strong cleats, and a movable rest in the centre. Directly above, in the roof, a strong iron ring is attached, to which tackle can be secured. Ordinarily a single block-and-fall is used. A better arrangement is to equip the stable with a sprocketed wheel-and-chain hoist, which will lift almost any required load without slipping and with relatively little personal exertion.

The loft should also be fitted with a triple row of long blanket-bars, and, if practicable, it is well to have these placed in a closet lined with cedar and fitted with dust-proof doors, so that furs and blankets can be safely left therein during the summer.

A man's-room with closet attached is usually a part of the fitting of a stable. It is customarily placed immediately over the harness-room and receives heat through a register in the side of the brick box, which below serves to enclose the heater in the harness-room, as previously explained.

LARGE STABLES.

The foregoing includes about all that need be considered in connection with the ordinary stables such as are built for the accommodation of from two to six or eight horses. There are every year being built in the large cities, stables for the large transportation companies and also for receiving horses to board, the accommodation running up sometimes as high as for two or three hundred horses in the same stable. There are a few special conditions to be considered in the arrangement of such structures.

These larger stables are always of masonry construction and are occasionally built with fireproof floors, though most of them are of the ordinary wooden construction. They are usually built in four stories, the first story receiving carriages, wagons, etc., over night, the second and third stories being occupied by the stalls, while the fourth story is used for storage and receiving of grain, hay, etc. A stable of this sort should always have a cellar under it and all floors should be made water-tight. In the first story, provision is made for an office and usually also for some room where teamsters, coachmen, etc., can wait while teams are being made ready; there should also be two sets of toilet-rooms. It is desirable to avoid columns in the first story so far as possible. This is not always practicable, however, and the spacing of columns is regulated very largely by the arrangement of the stalls in the upper stories, as the columns which carry the upper floors must of necessity coincide with the lines of the stalls. As usually built, the floor-beams have spans of from 28 to 30 feet, necessitating 4″ x 14″ hard-pine timbers, 12″ to 16″ on centres. The posts in first story should be provided with heavy cast-iron fenders on all sides to prevent the hubs from striking the columns. If wooden posts are used, they should further be protected by 3″ x 3″ x ⅜″ angles on each edge if square, or by a casing of wrought-iron if round, carried to a height of 6 feet. The carriage-wash should be 20 feet square, and should have immediately adjacent to it a trough not less than 24″ x 60″ and 16″ deep. There should be an overhead attachment for hose which will rotate to all points of the carriage-wash.

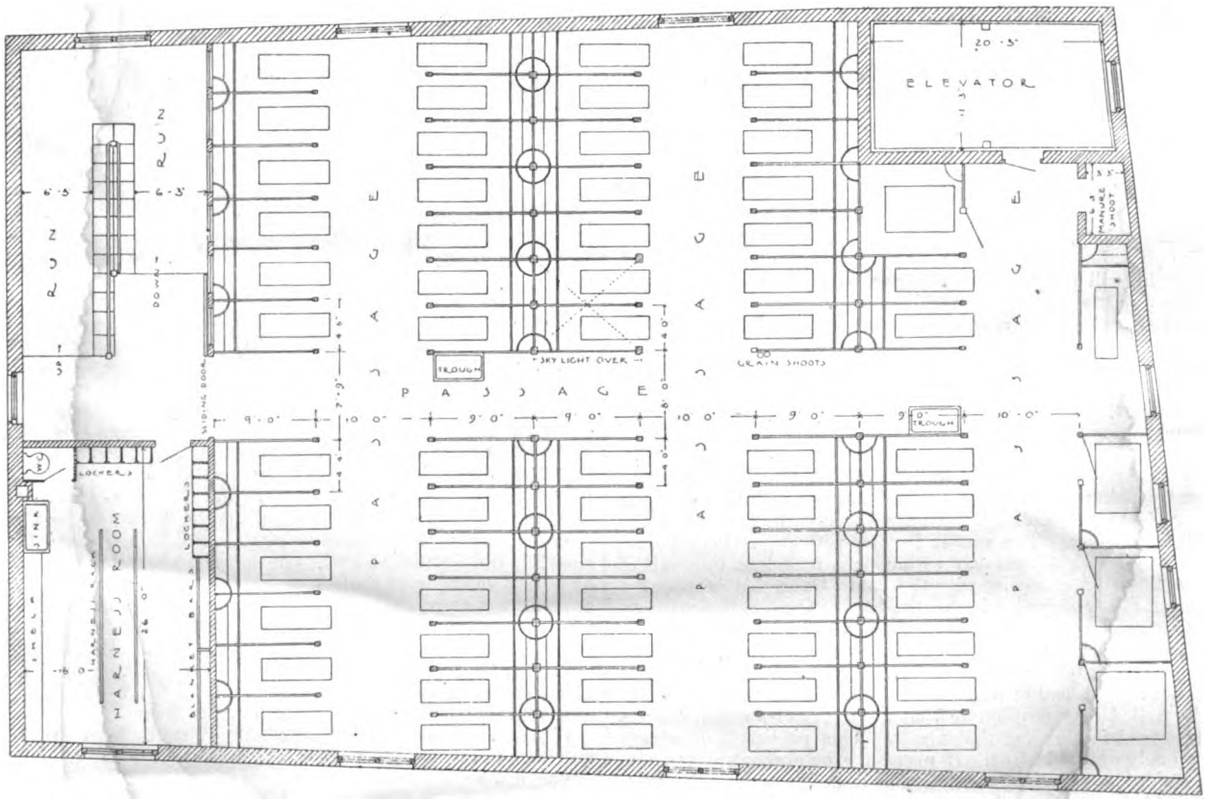


Fig. 10. Stall Plan of large Boarding Stable.

A stable of this description requires an elevator for hoisting grain, carriages and sick animals. The platform should be 9′ x 19′ and should have a lifting capacity of not less than 2 tons. The speed need not be more than 50 feet per minute. The openings into the elevator on the first and top story should be as large as the well will admit, but for the second and third stories ordinary 3′ x 7′ doors will answer. All the doors should be tinned on both sides, with rollers on the bottom, and the openings fitted with automatic gates. Where the arrangement of lot will permit, it is very desirable to have the elevator on the outside of the building, so that teams can drive directly onto the platform loaded with grain, etc., without interfering with the unhitching space in the first story.

Another special feature of a large stable is the arrangement for taking care of the manure. Commonly, it is pitched into a chute running the height of the building, terminating above a pit in the cellar. In large cities it is easy to contract to have manure removed without expense to the owner of the stable at intervals of not more than three days. Where the manure-pit is in the cellar, considerable nuisance is caused by being obliged to pitch the manure up on to the sidewalk, or main floor of stable, and thence into the wagons, and it is far better to have the manure receptacle located in the first story. The manure-vault or receiving-room should be built of brick

[1] Continued from No. 1090, page 53.

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throughout, with a brick floor covered with a heavy coating of Portland cement. The iron door giving access to it should be set up 16″ above the line of the first floor, and should not be less than 9′ high, so that the manure can be easily pitched from the chamber into a wagon. The size of the chamber will depend upon how often the manure is to be removed. In a general way, 100 horses will produce about a cord, or 128 cubic feet, of manure per day, the quantity of course varying with the kind of bedding and the frequency with which it is renewed. Leading directly from this manure-chamber there should be a brick chute, 24″ x 48″ inside, with walls not less than 8″ thick, extended to above the highest point of the roof and capped with a ventilating hood. In the second and third stories there should be an opening into this chute 3′ square, provided with an iron sill set flush with the floor level, and with a hinged iron door fitting as tightly as possible to the brickwork. In some cases, instead of an iron door a wooden slide is arranged, working up and down in grooves and counter-balanced by iron weights. The iron door is preferable.

An improvement upon the foregoing would be to have the floor of the manure-pit dished slightly and the walls lined throughout, including the walls of the chute above, with glazed brick. The whole could then be washed out clean with a hose, the water escaping through a trap placed in the floor of the manure-chamber, and closed ordinarily by an iron stopper. The writer does not know of such a construction ever having been used, however. Indeed, for that matter, except for reasons of economy, it would be far better that all the interior brickwork in a large stable should be faced with glazed brick or terra-cotta, but the cost would probably be prohibitive.

An arrangement for collecting manure was at one time suggested by the Boston Board of Health, and promised well, though the writer is not aware to what extent it has been adopted. The chamber in first story is made of a sufficient size to receive a large manure wagon, which is backed into position and left there. The chute from the upper stories is carried over to terminate above the centre of the wagon. The manure drops, therefore, directly into the wagon-box and does not have to be turned over to be removed. When the wagon is full it is drawn away and an empty one substituted therefor. The objection to this system is that more teaming is required, as the manure will not spread itself nor pack itself down, and in case of a heavy snow-storm or anything happening to the teamsters, there is no space for receiving surplus manure. The idea is an excellent one, however.

Access is had to the upper stories by horses, as well as by employés, by means of runs, which are usually arranged against a side wall, a narrow flight of steps being carried up on one side. The width required for the horses is from 5′ to 8′, while the steps for the men need not be more than 18″ wide. The pitch of the run is determined somewhat by the possibilities of the plan. Runs have been constructed and used without complaint, of which the pitch was as steep as 5″ to the foot. A better proportion, however, is 3″ or even 2½″ to the foot. The run is framed with heavy longitudinal timbers covered with 3″ plank, on which are nailed at intervals of 16″, 3″ or 4″ strips, crosswise with the run. Over this is spread a heavy bed of either scrap-leather or tan bark. Or, a better arrangement is to omit the wooden strips entirely and nail crosswise of the run sections of heavy rubber hose. Second-hand hose can be obtained from the fire-department for this purpose, and the hose is flattened out a good deal in wear, so that when it comes to the stable it is easily nailed into position and makes a very clean run, besides affording a good footing for the horses. This rubber is of course carried up only on the incline. If necessary, on account of arrangement, to make turns in the runs, which is usually the case, the platforms should be not less than 6′ wide at any point. The runs should start immediately adjoining the office in the first story, and at the head of the first run in the second story should be placed the harness-room.

The runs should be enclosed on the open side by a heavy railing of 1½″ steam-pipe thoroughly secured to the ceiling and to the side of the runs, and the well over the run should be carried up through the attic story, enclosed with windows and sheathed and provided with a skylight overhead. The stairs from third to fourth story can be carried up in the well.

The landings at the head of the run in each story should be not less than 10 feet square, and the open well at third-floor level should be protected by 6″ x 6″ hard-pine posts, spaced at intervals of not more than 3 feet and carried from floor to ceiling, a solid rail of 1¼″ sheathing being built between these posts to a height of five feet. It is well to enclose the run in second and third stories, separating the passages leading from the stalls from the platform at the head of the run by sliding doors and glazed partitions, thus preventing draughts on the horses.

Where space and considerations of cost will permit, a stable to accommodate one hundred horses or over should be provided with two runs located at opposite ends of the building, so that in case of fire, horses can be brought down from the upper story more expeditiously. There should also be a fire-escape on the exterior of the building, reaching from the ground to the fourth story, carried in a straight run from top to bottom without any turns, so that in case of fire, while horses are being led down the runs, the men can ascend by the fire-escape. This provision of a second run, however, has in practice seldom been made.

The question of heat in a large stable is largely regulated by the character of the occupancy, but in any case the office, the toilet-rooms, and the harness-room should be provided with enough radiating-surface to keep them comfortably warm in all weather. The portion occupied by stalls and upper story requires no heat at all. There should be in the first story not less than 350 feet of radiating-surface on the wall immediately adjoining the carriage-wash and 300 or 400 feet distributed at points. More than this means a waste, as the front doors are usually open in all weather and it is not possible to more than temper the air in extremely cold weather. The source of heat should be a hot-water system, the boiler being located in the basement and used also to temper the water for the carriage-wash and for the harness-room.

The harness-room, so called, is used practically as the workshop of the establishment. It should be located at the head of the first run, and for a stable to receive 100 horses should be 14′ x 20′, fitted with 8 wardrobes or coat-closets, a toilet-room and a 24″ x 48″ x 8″ enamelled-iron sink set up on legs and supplied with hot and cold water. Down the centre of the room there should be two lines of racks for use in cleaning harnesses, each consisting of a 4″ x 6″ hard-pine rail with rounded edges, 12 feet long, set up 5 feet from the floor on three 6″ x 6″ hard-pine posts, securely ironed to the floor. There should also be a cupboard for implements, a 10″ wide shelf along one side of the room, with a row of heavy brass hooks underneath, 6″ on centres, and space for about twenty lineal feet of triple blanket bars.

In arranging the stalls they can be put head to head, the individual stalls being from 4 to 4½ feet wide on centres and 9 feet long. The passages between the stalls should be not less than 10 feet wide, and if a central passage connecting all the rows is carried through the length of the building, this should be not less than 8 feet wide, and better 10 or 12 feet. A few box-stalls should be provided for sick horses, but two or three on a floor are sufficient.

The stall stories should be lighted by means of large windows at the end of each aisle between the rows of stalls, as well as by skylights; if necessary, carried down by means of wells to the central portion of the building. All of the windows should be protected by gratings of ¼″ iron, 2″ mesh, set in heavy iron frames on the inside of the windows. The end stalls in the rows against the brick walls should be sheathed against the brickwork the same height as the stall partitions. On each floor where stalls are arranged there should be a trough not less than 24″ x 36″ x 16″ deep, placed in the most central position, the floor underneath and for a width of 3 feet all around being dished and drained like a carriage-wash.

The stalls of a stable of this description are not essentially different from those described in connection with the smaller stables, except that on each stall-post a heavy harness-hook is usually arranged, the harness for each horse being hung thereon. This has the disadvantage of exposing the harness to the action of the ammoniacal fumes, but except in the highest-priced boarding-stables, it does not seem practicable to keep all the harnesses in a room by themselves, and the harness-room, so called, is used for storage, for cleaning the harnesses, etc. The harness-hooks on the stalls may be of any heavy wrought-iron or brass pattern, and some stablemen express a preference for wooden hooks, which consist of a 10″ or 12″ chestnut pin, driven-in from behind through a heavy iron socket, which is screwed to the post. A form of harness-hook is manufactured which is arranged with cords in such manner that after the harness is hung thereon, the whole can be lifted a distance of three or four feet, so as to be out of reach of the horses.

Figure 10 shows the arrangement of stalls in a stable which was built to receive 135 horses.

The drainage should be entirely exposed on the ceilings underneath the stalls, and the pipes should be not less than 4 inches in diameter nor more than 5 inches. The usual arrangement is to carry a single line of pipes longitudinally through the building, with branches each way to receive the drainings from the lines of stalls.

All of the floors in the second and third stories should be water-tight throughout.

The bins for grain in the upper story should be carried clear to the ceiling, with doors hung in sections to give access thereto. For a stable to receive 100 horses, there should be two bins about 14 feet square each. The bottom should be furred up so as to pitch 3 inches to the foot towards the centre, and the whole should be lined with galvanized-iron to keep out rats. The best location for grain-bins is near the centre of the building in such position that the metal chutes leading down to second and third stories shall be most accessible. A separate room should be provided for hay, which in a stable for 100 horses should not be less than 1,000 square feet in area. This should be lined with tin throughout on the walls and ceiling, and the floor should be laid over some form of fire-resisting medium, either one inch of plaster or some of the so-called fireproof papers. A fire in stables of this kind very often starts in the hay room.

Water-tight Floors.— There are several varieties of water-tight floors. If the construction is fireproof throughout, undoubtedly the best way is to level up the arches with Portland-cement concrete, having a thickness of not less than 3 inches at any point, and cover the whole with a thickness of 2″ natural-rock asphalt, laid hot and carried up at least 6 inches on the walls. Asphalt of itself is absolutely impermeable and it possesses a certain amount of elasticity. Unfortunately, however, it is very liable to be cracked by any unequal settlement or deflection, and in practice it is found very difficult

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to make and keep an asphalt floor perfectly water-tight. The writer has yet to see a single example of asphalt, or for that matter a concrete floor, which has remained tight for any great length of time. Concrete is sometimes used, but it is even more liable than asphalt to be cracked by deflections, and where conditions oblige the use of wood for construction, nothing has heretofore proved so satisfactory as some form of wood for waterproofing. For the first story of the stable, or where a great deal of water is not likely to be spilt on the floors, a certain amount of waterproofing can be obtained by laying, first, an under-floor of $\frac{7}{8}''$ spruce boards, over this three thicknesses of heavy tar paper laid and mopped with hot tar, or, better yet, of Warren's natural asphalt paper laid and mopped with Warren's preparation, over this a $1\frac{1}{2}''$ matched spruce plank floor, with an $1\frac{1}{4}''$ square-edged spruce finished floor for wearing. Very little water will get through a floor of this kind and the cost is much less than either asphalt or patented wood floorings. It will not, however, answer for stall floors, for if any urine at all works its way through wood, it will stain and look badly even if it does not actually leak. The most satisfactory form of wooden water-tight floor with which the writer is acquainted is that manufactured and laid by Dolbeare, of Boston. In this system a square-edged under-floor and a matched upper-floor, both of spruce, $\frac{7}{8}''$ thick, are first laid over the timbers. On this is laid a course of heavy felting or building-paper, bedded and mopped in composition, and above this is the Dolbeare flooring, consisting of $3'' \times 4''$ seasoned pine strips, planed on all faces, rebated on the under edges, and laid with $\frac{1}{2}''$ open joints which are filled with fine gravel and a composition analogous to tar or asphalt, which does not harden or become brittle with time. Against the wall a $\frac{7}{8}''$ riser is bedded in the same composition. The only drawback to this floor is the fact that, like all woodwork, it will absorb moisture and will in time smell bad, but for its water-tight qualities it is about the best thing in the market. The cost of this flooring depends somewhat upon the amount and disposition of the floor, but is in the neighborhood of 25 cents per square foot, laid.

C. H. BLACKALL.



PARIS

THE CZAR'S VISIT. — THE DECORATION OF THE CITY FROM AN ARCHITECTURAL POINT-OF-VIEW. — LAYING THE FIRST STONE OF THE PONT ALEXANDRE III. — THE NEW PALACES IN THE CHAMPS ELYSÉES.

PARIS makes a specialty of becoming madly enthusiastic when any particular event puts her *en fête* and excites her ardor for popular and grandiose spectacles.

The visit of the Czar of Russia, so important in view of the political alliance, had to be for Paris the signal for an outbreak of indescribable enthusiasm. During the days that preceded the arrival of the imperial pair and during the term of their stay, which happily was marked by beautiful weather, there was a flow of unforgetable multitudes over the streets, adorned and illuminated as they never were before. Now that our spirits are abated and the feverishness calmed down, it may be possible to derive some instruction from what was done and the results that were achieved during the public festivities.

We have at Paris a certain number of monuments which we were vain enough to desire the Czar to visit. If these monuments are fine, it is doubtless because of their proportions, their details and the manner in which their voids and solids have been studied. If, then, we change these proportions, if we fill up some of the windows with flags, and if we hang from their balconies long and heavy festoons of drapery, we absolutely modify the aspect of the monument and completely destroy its *ensemble*. Such is the ordinary result of official decoration. The administration addresses itself to the decorators who, for their part, have but a single thought — to furnish the greatest possible number of masts and oriflammes for the streets, of trophies, flags and red velvet sprinkled with gilt for buildings. And the more of this sort of thing there is, the richer the effect ought to be. Since there is not always time enough to give to watching over everything, the contractors are usually left to their own devices.

That the bridges and quays should be decorated with masts and banners detaching themselves against the sky is a reasonable treatment; it breaks no line, but, on the contrary, creates new ones that are gay and sparkling. But the too great profusion of these masts in the streets really encumbers them and often interferes with wide and fine perspective vistas. The greater part of our buildings have during the fêtes been overloaded with heavy draperies that added nothing to their beauty. Did the Cathedral of Paris, for instance, need a heavy red background behind its admirable colonnade to show off its elegance and fineness? On the Place de la Concorde, which was very much decorated with pylons and flag-bearing masts, the architectural lines of the Garde Meuble and of the Ministère de la Marine, whose colonnades were very discretely decorated with trophies, produced a good effect of monumental grandeur. This was instructive, and it leads one to ask whether during public festivals a new impression from the point-of-view of decorative effect might not be sought in not overloading the *public* monuments and leaving to the private houses the task of lending gayety to the streets through their own decorations alone. The architecture of the public monuments could be all the better noted and would more easily affirm their own value. In any case, without carrying this idea to extremes, it seems that a little more sobriety in the decoration of public monuments would not prove a lack of good taste.

This bit of criticism put on record thus, it must be confessed that everything, of all kinds, that had to be created, was handled in the most charming manner. In the first place should be mentioned the pretty reception pavilion on the Ranelagh, near the Passy station, built in six days under the direction of M. Scellier de Gisors, architect. We will not attempt to chronicle the fêtes, as their details have been given in the newspapers, but there was one ceremony which, more than any other, had an interest for us because of its relation to the Exhibition of 1900, this was the laying of the first stone for the bridge that is to be built over the Seine on the axis of the Invalides. This bridge, of which the decorative treatment is not yet determined, will be 40 metres wide and consist of a single arch with a span of 110 metres.

On Wednesday, October 7, the first stone of this bridge, to which has been given the name of Alexandre III, was solemnly laid by the Emperor of Russia, in the presence of the Empress Alexandra Feodorowna, the President of the Republic and a vast multitude of onlookers. At the head of the bridge, whose extremities on either side of the river were marked by four handsome pylons, was erected an imperial tribune on the Cour-la-Reine, with *gradins* for the diplomatic corps, the senators and deputies. Upon either side of this central tribune, sheltered under vela and decorated with flowers, stretched two other tribunes for invited guests. On their arrival, the Czar and Czarina were received by the President of the Republic, then after the presentations and the playing of the Russian hymn and the Marseillaise — how many, many times these tunes were played during those three days! — their majesties advanced under a velum stretched over the quay. A chariot engarlanded with flowers then approached, bearing a block of granite that is to make part of the first pier of the bridge, and M. Boucher, Minister of Commerce, pronounced the following address to the Czar:

"*Sire*,— France has desired to dedicate to the memory of your august father one of the chief monuments of its capital. In the name of the Government, I come to beg your imperial majesties to sanction this act of homage on the part of an entire people and, in conjunction with Monsieur the President of the French Republic, lay the first stone of the Pont Alexandre III, which is to connect Paris with the Exposition of 1900. Your Majesties will thus give to the grand work of civilization and peace that we are about to undertake the high approval of the Emperor and the gracious patronage of the Empress."

After the usual custom, French and Russian coins of the mintage of 1896 and an account on parchment of the ceremonies were deposited in a cavity in the stone, and covered with a small slab, upon which, in turn, the Czar, the Czarina and the President spread cement taken from a bronze tray.

As soon as this portion of the ceremony was finished, from the other side of the river, which was covered with tribunes, set out a boat, bearing sixteen young girls clad in white, which made its way between double rows of decorated boats, bearing many military bands and covered with flowers. On reaching the hither side, these young girls, operatives of the better class, presented to the Czarina a magnificent vase of chiselled silver, set with caobochons and precious stones, and filled with flowers. This vase, which was exhibited at the Exposition of 1889, was designed by our *confrère*, M. Paul Sédille.

It is not possible for one who was not present to form a conception of the imposing character of this ceremonial. For us, it was the consummation of a most important act, the prologue, in fact, of our Exposition of 1900, the success of which was thus affirmed by this act of imperial collaboration. The actual work, a little retarded by the preparation for these fêtes and the festivals themselves, is about to enter on a stage of activity.

We have already mentioned the embarrassment there was in appointing as architect one of the prize-winners in the recent competition for the new palaces in the Champs Elysées. Since that time a solution has been reached which gives general satisfaction. The competitions for the smaller palace produced a more satisfactory result than did the one for the larger building, and accordingly the author of the first-prize design deserved to be entrusted with its execution. Now, it happened that M. Girault also competed for the larger palace, and a fourth prize was awarded to his design. Moreover, in the competition in 1895 for a general scheme for the treatment of the buildings for the Exposition of 1900, his design was awarded a first place because of its marked merit. These repeated successes of this young and distinguished architect — the only competitor honored with a prize in each of the three competitions — gave sure guaranty of his talent as a designer. It was inferred from this that such an artist as he had proved himself to be might be safely entrusted with the execution of both the palaces in the

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Champs Elysées, and to him has been awarded this onorous but glorious task.

M. Girault was born in 1851, and won the Grand Prix de Rome in 1880. Having carried off several medals in the Salons of 1884 and 1888, and at the Exposition of 1889, La Société Centrale, in 1893, bestowed on him its medal for private architecture. In addition to these facts, his being a member of the Conseil Général des Bâtiments Civils gave further pledge of his being a man of executive ability and experience.

His colleagues, chosen from the number of his competitors, are MM. Louvet, Deglane, Binet and Thomas. The first three are still young, M. Binet being only thirty years of age. M. Thomas, however, was born in 1847. For many years he has been architect to the Palais de l'Industrie, and has carried out the many transformations in that building required by the various exhibitions and competitions, so that his special experience of the requirements that must be satisfied make him a most valuable assistant. Both he and M. Deglane are Grands Prix men, while M. Louvet has been five times a "*logiste*," winning in 1885 and again in 1886 the Second Grand Prix. Such, then, are the workers. Now, what will be the results of their work?

The scheme is practically determined as to its *ensemble*, but much of the detail will be modified as the work progresses. We only fear one thing, that is, that the time at the disposal of the architects is so short that, in spite of their talent, they may not be able to bring to a successful issue so large and complicated an undertaking. They have undertaken to perform a real *tour de force* and perfection will be demanded in the result. Alas! justice was never intended to be accorded to architects, and already professional critics are at no loss for bitter words to pour out upon schemes of whose real features they are still in ignorance. There promises to be abundant and amusing discussion, and plenty of severe verdicts will be rendered with facile ease by those who think everything ill done that they do not themselves do, although, generally speaking, they are the very people who never do anything at all.

DEEP AND DIFFICULT BRIDGE AND BUILDING FOUNDATIONS.[1]



YOU are all doubtless familiar with the form of our iron and wooden caissons, and understand that as soon as we reach the bed-rock or the point of destination, whether it be of rock, clay or any other substance, the caisson has outlived its usefulness except the part called the roof, on which a monolith of concrete is used, which is the case in nearly every instance. This roof comes immediately between the concrete on which the masonry rests and the concrete used in filling the working-chamber, consequently, the less timber there is used in the roof, the less the compaction will be. Mr. George S. Morison in his system of caissons has reduced this to a minimum, as he has so arranged his plan that he forms an arch of concrete on a thin roof, thus doing away with the necessity of many courses of timber to sustain the weight of masonry, etc. . . .

After putting this caisson [for the bridge over the Harlem River in New York] in position, I was removed to 68 Broadway, and took charge of the pneumatic caissons put down to carry the Manhattan Life Insurance Building at the above number. We used under this building 15 steel caissons of various forms. Those were put down on an average of 50 feet below the grade of Broadway. We held up the Consolidated Exchange Building on one side, and immediately next north of us was a very old six-story building, and adjoining this was the heavy Title and Trust Building. So effective was the plan adopted to do this work that we did not even crack plaster in those surrounding buildings.

The Manhattan Building was planned by Kimball & Thompson, architects, of New York; and to those gentlemen is due the credit of adopting the pneumatic plan for sub-structure of buildings.

As before stated, the caissons were built of steel, and immediately on the roof-plate we started the brick pier, carrying this up to the required height, without any shield. We used in the construction of those piers 800 tons of steel, and to bring the tops of piers to a level of the cellar floor, over two million brick, set in Portland cement. We also removed 5,000 yards of excavation through that busy section of New York, and completed this work in ninety days, and this without accident. . . .

We have as yet said nothing about the freezing plan for our sub-structural work. This enables us to go beyond the possibilities of man's endurance under compressed-air. By this process, we can defy the flowing quicksand, water-bearing materials, or even water, and hold it absolutely rigid until such time as we have completed our work. There have been several shafts sunk by the Poetsch system in Europe, and one in this country.

The plan adopted to put down a shaft at the Chapin Mines, Iron Mountain, Michigan, was that of a boring down through the water-bearing quicksand to the solid rock, 104′, with a 10″ pipe.

Those pipes were put down through this sand and boulders by using a powerful jet on the inside of pipe. The pipe was held by a heavy frame in a vertical position, and on this frame was fastened a short section of the same size pipe with a large cog-wheel attached; in this were worked two pinions attached to the engine-shaft, employed to give the rotary motion needed. Boring down those pipes was quite a difficult work, owing to the large number of boulders bedded in the sand: while sinking the shaft we found and removed, among others, one which weighed over seventeen tons. We also had on the point of pipe a toothing of steel.

After those pipes had been jetted and bored down to solid rock, we then inserted in the 10″ pipe one of 8″ diameter, with a cap on the bottom end, and then withdrew the 10″ pipe, care being taken to make every joint in the 8″ pipe absolutely tight, as any leakage of the circulated non-freezing fluid into the sand on the outside would prevent the sand thus contaminated from freezing. After we had put in all the pipe needed to form the circle required, we put down the inside of each of the 8″ pipes, a smaller one for circulating purposes. This pipe was 1½ inches in diameter, and was open at the bottom and connected at the top to a header, and this, with our circulating pump, was in turn connected with our fluid tank, containing our heat absorbent, which was composed of chloride of calcium in solution. This congeals at 35° C., or — 31° Fahr.

This we reduce to a very low temperature by the use of an ice-machine. We used for this work the Linde machine, which we charged with anhydrous ammonia; compressing this to a high pressure, then passing the ammonia through a coil of pipe submerged in a tank, into which we pumped cold water, delivering the water at the bottom of the tank and allowing this to overflow at the top, carrying with it the heat produced by compressed ammonia in the submerged coil, the length of pipe in coil being at 8,000 feet. After receiving this cold bath the ammonia passes to the expansion valve; when expanded it became intensely cold, somewhat changing its form from that of anhydrous to semi-gaseous. This passes then through another coil of pipe about eight thousand feet in length, which is submerged in an out-tank containing our cold-producing fluid. And after doing its work here it is conducted back to the ice-machine to be compressed over; and in this way kept circulating through the coils of cold-producing pipes. The cold fluid is then taken up by the circulating-pump and forced through the whole system of pipe in the ground, absorbing the latent heat. This fluid, being delivered at the bottom of the stand-pipe, raises that on the outside of the 1½″ pipe; it is then conducted back and delivered again over the top of the tank for re-cooling. Our circulating-pump being attached to the bottom of the tank, we at all times get the coldest fluid. The difference of temperature of the fluid returning and going out is two degrees less. We had about fifteen thousand gallons of this fluid in pipes and tank, which we circulated through the system of pipes every thirty-three minutes. We regulated this flow into the stand-pipe by a system of valves. In this way I was enabled to get the same flow into each stand-pipe, consequently the same temperature in each. The frozen ground took the form of a cone. As soon as I found that the frozen ground between the pipes had become united, we started our excavation, going down 40 feet before I put any timber in. From tests made by myself down in the shaft during the progress of the work, I found the quicksand, when frozen, to be about equal to sandstone in strength, and required blasting to take out, using heavy charges of dynamite.

We found that, as the work went on, we could, and did, stop the freezing-machine for several hours at a time. This did not seem to injure it any; and after the work was complete, it took several weeks to get the frost out of the ground. After the ground was back to its normal temperature, there was not a particle of noticeable change in alignment of shaft.

I am confident this process must, in the near future, come more into use, as it only needs to be understood to be appreciated. . . .

Among the successful pile foundations put down in Chicago, I would mention that under the Illinois Central Depot at Twelfth Street, by our worthy president; the new Stock Exchange Building on La Salle Street, by General William Sooy Smith; the new Public Library, and others I need not mention, the results of which are clearly to be seen. . . .

One thing we should do, whether our foundation be pile, pneumatic, concrete, or any other form, let us do our best, and be willing to pay such prices that will enable the engineer or contractor to do just and honest work.

[1] Extracts from a paper by Mr. George E. Thomas, read May 6, 1896, before the Western Society of Engineers and published in the *Journal* of the Society.

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In 1889, I was sent out to the extreme east of Maine, to put in a light-house in the Bay of Fundy, about a mile and a quarter from the main land, for the United States Government, at a place called Lubec. From the boring made previous to the contract being let, the Light-house Board concluded to build this house on a cylinder, 32 feet in diameter, and about forty-eight feet high; fill this with Portland-cement concrete, and on this build an iron shell for house, backing this with brick, set in Portland-cement mortar.

Specifications read something like this: There is 17 feet of water at low tide; the cylinder must be dredged down about five feet through soft mud and gravel to hard-pan; then put in 17 feet of submerged concrete; then pump water out of cylinder, and put in remaining concrete, bricking up water-tanks, etc.

Previous to putting in any concrete, I made a boring and found that there was not anything like hard-pan to be found there. I at once notified the engineer in charge that I did not think it safe to put the house up on such a soft bottom.

Major Stanton, who had charge of this district, came down to Lubec, and we made a thorough examination of the subsoil. This he found to be as represented by me. I made several borings, and put the bit down 96 feet, mostly through clay, with some gravel. After the Major had consulted with the Board at Washington, they concluded to have me drive piles on the inside of the cylinder. This was more easily talked about than done, there being a fluctuation of over twenty-four feet of tide, and a terribly rapid current, besides the storm and fog at that end of America, to contend with. However, with all those difficulties we put in over two hundred piles, a large number of them being 77 feet long when driven. These were made of two sections. After driving the first section, we sawed the butt off perfectly true, put a dowel in the head of this, and brought the point of the second section to meet this, taking care in our selection of these sections to have them as nearly uniform in size as possible; then bolting up and down the joints fish-plates of oak. The first thing to be done was to get a pile-driver and engine up on the top of the cylinder. This we did very successfully. Some days we would only drive one or two piles; then the sea would come up and break over us, compelling us to wait for better weather. But fortune favored us, and we finally completed this foundation. We also completed the whole structure.

During the progress of our pile-driving, I received instructions to test two of those piles, driven at a given distance from each other. This I did in such a way that there is no doubt of the result being correct.

We put a platform around the piles, and on this we loaded Kent ledge or pig-iron, weighing every nail and scrap of timber and iron, so as to know exactly the carrying-capacity of those piles. Pile No. 1, 52 feet long, 16½ inches in diameter at the butt, 8 inches point, had a penetration of 34 feet into the clay. This pile we loaded with 49,750 pounds of iron. There was no change or settlement from the 13th of the month to the 20th. For the next six days it settled very slightly. In the first twenty-four hours, ⅛″; in the next twenty-four hours, $\frac{3}{32}$″ until it stopped on the sixth day. Pile No. 2 was driven the same day, and allowed to stand one week before loading. We then put on this one (keeping the other loaded) 65,585 pounds of iron. This one started down and went 4½ inches in the first twenty-four hours, and in the next twenty-four hours only ½ inch. I then reduced the load 1,173 pounds, the pile settling $\frac{17}{16}$″; and so, until I reduced the load on the third day 1,939 pounds. The piles still kept settling. I again took off 1,289 pounds. Thus, you see, I reduced the weight 4,400 pounds. After taking off this amount, the pile stopped settling, but it still left us an excess over the other pile of 15,835 pounds. This can be accounted for in this way: Pile No. 2 being 17 inches butt and 8½ inches point, penetration was 2 feet greater.

I am satisfied the second pile settling was the means of taking the first one with it, as the settlement of the two piles stopped the same date. I am in favor of large piles, especially when they cannot be driven to rock or hard-pan. In this way we get a greater friction, consequently more carrying-capacity, but in every instance would advocate driving to hard bottom.

THIRTIETH ANNUAL CONVENTION, A. I. A.[1]— III.

DISCUSSION OF THE PAPERS ON INFLUENCE OF STEEL CONSTRUCTION, ETC.

MR. CARRÈRE: I am particularly impressed with some suggestions contained in Mr. Yost's paper in relation to supporting more masonry on the framework of high buildings than is necessary, especially in the construction of the exterior walls. It seems to me that if the supports of the building could be set far enough inside of the envelope to make it constructively a complete building, we could then have much more freedom in the designing of the envelope or façade. This suggestion seems to be very valuable.

It is rather surprising, in a way, that so much fault is found with the designing of these tall buildings, which are classed as failures, when we consider how little is said about the other class of buildings, especially as this high-building problem is one that can only be solved by degrees. This high-building problem is very important. The edifices are large, and are built so rapidly that sufficient opportunity for study is seldom afforded, and the improvement must be progressive with successive buildings, and, therefore, very gradual. An important feature, however, in connection with this work, one which is very far-reaching in its influence upon our work as a profession, is the establishment of general laws and municipal ordinances to govern the surroundings of these buildings.

The present conditions are the reverse of what they should be. The spaces and streets are narrow and contracted, and the problem for us to solve at once, as architects and artists — and which cannot be solved at all unless it is taken in hand promptly and before it is too late — consists in regulating these conditions of environment by legislation, and in this way bring about new conditions which will in a measure compensate for all the defects and shortcomings of the high buildings.

If our high buildings are designed (as has often been suggested) with the successive stories receding, the result would be practically a series of pyramids; but we are doing just the reverse of this, and by the projections, cornices and other similar features, we are making our buildings wider at the top than at the base, and our surrounding streets are fast becoming absolute cañons and dark passages.

These are the difficulties which we are now facing, difficulties which we can correct, at least in a measure, at once. Plate-glass and steel have come to stay, but they must be developed, and when they are fully developed we will have a number of buildings even higher than at present, and which will be absolutely permanent, and we ought to prevent their being erected under the present conditions of environment, which would become permanently unhealthy and unsightly conditions, and which would necessarily influence not only the health, but the character, habits and development of the population of our cities.

This problem I consider a very serious one, because it is subject to immediate improvement from every point-of-view, and it is one which is clearly within the range of influence of the architects.

It seems to me that a highly interesting and profitable discussion — perhaps at the next convention of the Institute — would be timely, dealing with the best means of meeting these conditions in an artistic and practical way.

MR. HALLBERG spoke of the questionable manner in which some high buildings are constructed. When a high steel-frame building is constructed, and, we will admit, of abundant strength and safety at the time of building, carries all exterior coverings, and these are of porous absorbent masonry, the vital question is: How long will such building remain safe? Dampness from rains readily penetrates to the supporting steel members, causing corrosion. How soon this action will so weaken the carrying members as to make them unable to support the enormous loads placed thereon no one can tell, but we all know that it is taking place, and in some instances with great rapidity, which will in time make such structures dangerous. All buildings should be constructed with sufficient walls or masonry to be self-supporting, and not carried by the steel posts as is the practice in some places. He liked the New York practice of building walls heavy enough to support themselves, and the floors only carried by the steel skeleton. He believed that the rule should be followed in other places.

MR. POST: Gentlemen, I believe that I am responsible for the first suggestion of steel-cage construction in building, some sixteen or eighteen years ago, in the Produce Exchange Building in New York, in which I built for the central court-yard wall a cage of cast and wrought iron with panels of brickwork, the precursor of the present steel cage; therefore, I think that I am justified in criticising, to a certain extent, the results and in saying a few words upon the subject.

We Americans are a queer people. We are subject to the rapid spread of mental epidemics. At the present time we are going through an epidemic of the steel cage,— I mean the steel cage where a skeleton is built and enclosed in the very smallest amount of masonry, in many instances, which can be made to cover it.

I was brought up as a civil engineer, and have always retained, while practising architecture, a large interest in engineering questions. I have made certain investigations with regard to the relative corrosion of cast-iron, wrought-iron and steel, which leads me to the conclusion, principally from the conditions of some good quality I-beams, which had been thrown aside in a rolling-mill, and exposed unpainted to the atmosphere for three or four years. I have been led to the conclusion that the corrosion of structural steel is to be looked for as a much more serious danger than the corrosion of iron; that it penetrates more deeply and will be more apt to seriously affect the structural efficiency of the material; therefore, I have absolutely declined personally to build any buildings with a steel cage enclosed with a minimum amount of masonry. Now, if you enclose a cage with a sufficient amount of masonry to furnish an adequate protection from the effect of rain and absorption of water from the outside or from the inside, and to afford an adequate protection from the danger of a great exterior conflagration — for I assume that any good fireproof building is safe against any interior conflagration of an ordinary character,— and if you build your building so safe against exterior conflagration that the expansion of material will not break your knee-braces or gusset-plates, or strain your connections so that they will become ultimately unsafe, you will find that in ordinary cases you have enough masonry to support itself

[1] Continued from No. 1089, page 46.

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independent of the cage, provided the cage supports the floors and roof, and adequately braces the walls laterally.

I therefore submit to your consideration, if it is not better and more economical and more artistic to make your cage sufficiently strong to adequately support the floors and roof, to give it sufficient lateral stability to adequately take up all strains from winds and slight earthquake shocks, and to build self-supporting walls. If this is done, the columns and girders are protected from the atmosphere, they are protected from the influence of fire, and I believe that you will find the building will be cheaper and more readily built, and the capacity for architectural design will be infinitely increased. I see no reason why in our steel-cage buildings the walls should not look strong enough to support themselves.

I may refer to the demand for the maximum glass surface, so prevalent in some sections, also as epidemic. What is the use of making a whole set of offices of plate-glass, when the tenant will put on blue and green and red and yellow shades to cut off his light and use only a portion of it? I do not speak feelingly in this matter, because in New York they do not demand it. They expect a proper and reasonable amount of light, but they do not demand that the whole building shall be of plate-glass, as seems to be the case from the character of the buildings I have seen in some other cities.

We have been considering the question of the development of style. I do not fear contradiction when I state that in the past the development of architecture has been a matter of natural selection and the survival of the fittest, the rejection of the incongruous, and it has extended, not through five or ten years, but through hundreds of years. Can we, with all our powers of invention, expect to jump in one or five or ten years into a style of architecture? Our great-great-great-grandchildren may have evolved a style of architecture which may be more eminently fitted to our style of construction than anything we have at the present day. All that we can do is to do the best we can with our present resources. In doing this, I think it is due to ourselves and our art that we do not attempt to accomplish these results by stretching out our cornices and columns to many times their proper height, or by playing any tricks with the recognized styles of architecture, because they have gone through the process of natural selection and have been developed. Let us do the best we can with our problem and struggle with it, and I think in the end we will achieve a reasonable success, and if we do not forget that precedent is valuable, success is much more sure than if we strive for the immediate originality.

Mr. O'Rourke: My interest in this subject impels me to say a few words upon it. My professional experience in the City of New York and the immediately surrounding country antedates that of any living architect practising in that city to-day, and while my practice has not been so extensive or lucrative, it has been rather broad, covering a wider professional field than that of most architects. I, therefore, have seen the birth and development of steel construction and take a great deal of interest in it and in the discussion of this subject. I think we ought to discuss and handle it as an accessory to architecture proper, for it has been truly said that all the arts, and I might add most of the sciences, too, are the handmaids of architecture.

Now, iron and steel construction, properly speaking, is an engineering problem rather than an architectural or artistic one, and ought to be so considered. The science of engineering, being eminently one of definition and exactitude, requires the most thorough mathematical training, whereas, in artistic design or treatment we can use our imagination, and while that imagination, in order to have good results, ought to be based upon a good artistic training, yet there is no necessary danger to the building in the exercise of the untrained imagination in its design merely. There is danger, however, of producing an incongruous or a bad design, and hence the necessity of the architect having a training in painting and sculpture and in art generally. But in steel and iron construction he requires the assistance of a thorough engineer in that specialty, as no architect can expect to be able to cover thoroughly and in detail such a wide field. The true theory, in my opinion, of architectural steel and iron construction is to consider it as an accessory rather than as an essential in architectural composition, and its true mission is to give additional rigidity and strength to architectural design when erected. My practice is to construct the walls as if I had no steel or iron in them. Every building designed under my supervision in Washington, for the Government or in my private practice, will be found to stand that test. The walls when built show neither steel nor iron construction. This construction is added for additional rigidity and strength, but in case every post rusted out, the building will stand just the same, with a reduced but still sufficient factor-of-safety. This in my opinion is the true way to construct a modern building.

Mr. Yost: I do not care to say anything upon the subject, except to make one suggestion in regard to the building of walls, whether they be built apart or supported on steel construction. They ought to be built so as to be able to support themselves in case of fire. Many will be surprised that a brick wall will expand with heat more than steel or iron. This is a thing to be thought of in building a wall of any considerable height, which is expected to stand a conflagration from the outside, like the Chicago fire. The wall needs something to hold it up, because the side next the fire expands more quickly than the other. The question of safety on that score should be taken into account in building walls two or three hundred feet high.

Mr. Stone: I wish to say one word and call especial attention to what Mr. Carrère says about the importance of the surroundings of high buildings, and the necessity of municipal legislation upon the subject. The limitation in the height of buildings should be dependent upon the amount of space in the streets, not on the value of the sites upon which they are built. For instance, on going to New York and looking about City-hall Park you will say, what an admirable space for high buildings, but one has only to go into the cañon behind the park to see the infelicity of putting the high buildings on narrow streets. If high buildings are to be built, cities should widen these narrow streets or open great squares. The expense would be great, but if abutting owners want to erect high buildings and secure grand architectural effects, they should pay the damages for opening up the squares devoted to them.

Mr. Post: The sole excuse for tall buildings is the enormous value of property. If it were not for the fact that it is so tremendously high, it might not be so useless to try to get property-holders to consent to widen the streets.

Mr. Carrère: The very fact, that the main reason for the erection of tall buildings is the immense value of the property upon which they are erected, may serve a purpose, as suggested by Mr. Stone. In the case of New York City, for instance, we all remember the competition for the City-hall, which was indeed a typical case. The new City-hall was to be crowded into the little park, surrounded by very tall buildings, thus destroying all possible prospect for a monumental or artistic effect. The present small building is not so much out of scale with the park, but the new building was to be about ten times as large, and it would have been so important that the surroundings would have been entirely inadequate, even without the high wall and overpowering background of tall buildings.

We made a careful study in our office, as a matter of curiosity, and found that by going three or four blocks farther up town, the city could condemn land which is practically valueless at present and is not paying taxes on its true value. It could condemn several blocks of land between Broadway and Centre Street, place the City-hall on Centre Street, and make a fine park in front of the City-hall, between the building and Broadway, and thus obtain a magnificent approach and vista, a new park, and surroundings commensurate with the problem.

The building itself would be just as central,— more so than in the present City-hall Park, as it would be in close proximity to the Tombs, Criminal Courts, Second and Third Avenue elevated roads, the Brooklyn Bridge, and many of the street-car lines.

These improvements would make all of the adjacent property so valuable that the increased valuation on the property and the increased taxes resulting therefrom, would create a sinking fund which in about thirty years would pay for the investment. This suggestion is in line with Mr. Stone's remarks.

New York, of course, is not so fortunate as some other cities, as many of the conditions are already fairly permanent, and the opportunities for such investments are not so easily found as in other cities; but there are many cities where a word of warning would be very timely, and I believe that they should be advised to foresee and plan such improvements.

An interesting illustration of what can be done, even in New York, can be seen in the case of the Waldorf Hotel. The Astors have erected a tremendous building on a part of a block extending from Fifth Avenue to Sixth Avenue,— which they own,— and they are now opening a new street, parallel with Fifth Avenue, in the rear of their hotel, from Thirty-fourth to Thirty-fifth Streets, thus placing their building on a square, surrounded by four streets, with ample light and ventilation; and on the west side of this new street they propose to erect a large office-building, on that part of the land which would have otherwise been in the centre of the block, and of little or no value.

They have thus secured a most desirable improvement purely as a matter of business, but which results most decidedly in a great benefit to the neighborhood, from an artistic standpoint as well.

The centre of this entire block is at present devoted to back yards, or what might be termed a large interior court, and the land lies idle. It has occurred to them that the sacrifice of the necessary land for the opening of the new street will be more than balanced in value by the extra frontage obtained on this new street, and the utilization of land otherwise of little or no value.

If such problems were more freely discussed, it would result very soon in a more sensible method of building, and it might eventually result in beautifying and improving our streets, where we are now crowding and injuring our property.

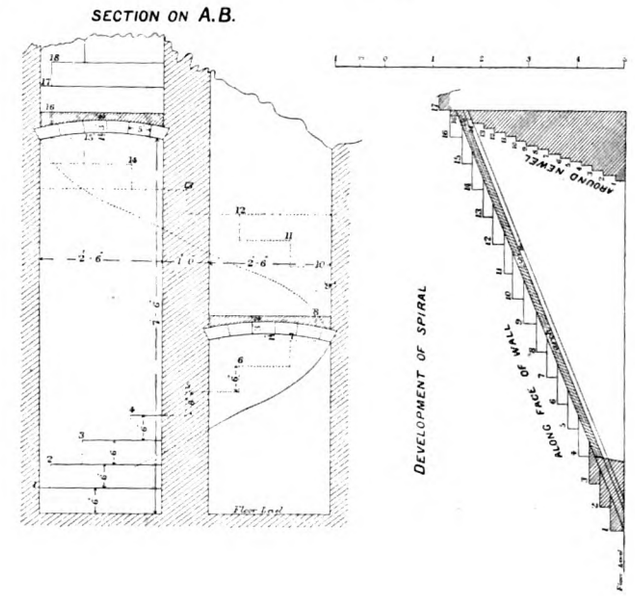
Mr. Stone: I think the remark that the President has made is correct, but what gives value to these high buildings is the fact that they are isolated, that they are getting their light by being higher than the surrounding buildings. And so that is the thing which we, who are in the position, should warn the municipalities in which we live not to allow these high buildings to occupy every section of the

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city. What is going on in New York will simply defeat its own object, for in streets occupied solidly by high buildings the lower stories will have little value and, deprived of light on their sides, their rental value will be no greater than buildings of much less height.

BRICK SPIRAL STAIRS.

THE plate gives the needful details for building spiral stairs cheaply. One of the items, and a principal one, which goes to swell the cost of building brick spiral stairs is the necessity for centerings. The plate shows a method of building the stairs without any centering, and the reduction in cost effected makes a brick spiral staircase cheaper than one made with either iron, wood, or stone, and, for the purpose, equally as substantial. The method requires no skill whatever, and for simplicity of construction, expedition and smallness of



cost, there is nothing to come up to this brick in chunam[1] stair. The method customarily adopted in Madras is the following:

Taking a typical Madras brick in chunam spiral stair as an example, the dimensions would be:

Diameter of stair, wall to wall, inside	6′	
Diameter of newel in centre	1′	
Headway, *i. e.*, from top of step to intrados or arching overhead	7′	1½″
Risers, each		6″
Tread at wall	1.18′	
Tread at newel	0.2′	

Having determined the rise and number of steps in the usual way, work is commenced by building up solid two or three steps, when the arch is then started by ordinary terrace bricks, 5″ x 3″ x 1″, in lime mortar (1½ parts slaked lime to 1 of clean river sand). The bricks are put edgewise flat against one another with their lengths in radii from the centre of the stair and are simply stuck on to one another by the aid of the mortar without any centering, after the manner pursued in Madras terrace roofing. On the plan of the stairs in the annexed plate the arrangement for arching by these thin terrace bricks is shown at *y*. A slight rise of 1½″ is given to the arch as shown in the section.

For the forming of the steps over this arching ordinary bricks are used, usually 9″ x 4½″ x 3″, trimmed to position and placed on edge, as at *x* in the plan.

The Madras bricklayer is very expert in building these stairs, and is satisfied if, after a reasonable time for the mortar to harden, the work should bear a load of 3 cwt. placed on a step and show no signs of giving. This will be found to approximate the breaking weight of a brick-in-mortar beam allowable in practice. With good materials, however, the steps will bear much heavier loads.

The following would be the relative approximate cost of different kinds of spiral stairs in Madras, and it will be seen at once how much cheaper the brick stairs are than iron, wood, or stone.

For a wooden stair, 3′ radius, per step	Rs.	4 8 0
Iron stair, each step 20 pounds, per step	"	3 2 0
Dressed stone, per step	"	4 0 0
Brick-work as described above, per step	"	0 15 0

The above rates include the newel, but not the outer wall surrounding and partly supporting the stair.—*J. M., in Indian Engineering.*

[1] A shell, or coral, lime mortar.

SOCIETIES

NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE New York Chapter of the American Institute of Architects held its annual meeting for the year 1896-1897 at its rooms, 156 Fifth Avenue, on Wednesday, November 11, 1896, President Upjohn in the chair.

The minutes of the last meeting and the annual reports of the Treasurer and of the Committee on Examinations were read and accepted; the annual report of the Executive Committee was as follows:

Your Executive Committee begs to state that since its last annual report it has held seven meetings.

Owing to conditions familiar to all, the year has been a hard one as regards finance and, doubtless on that account, several parties who had contemplated offering themselves as candidates for membership have suspended the preliminaries usual in such cases. It is also to be said that, at the beginning of the year, your Committee thought it advisable to make the formula of application which candidates are required to sign, somewhat more stringent in one of its provisions than previously.

The Chapter has lost one Practising Member, Mr. A. Page Brown, of San Francisco, by death, but this has been balanced by the acquisition of another, Mr. H. F. Kilburn, of New York City.

In your Secretary's recent report to the Thirtieth Convention of Institute at Nashville, in filling up the formula as to the membership in this Chapter, he thought it advisable to give the following information in regard to its Junior Membership:

"As questions on the relations of Chapter Members to the Institute are still in abeyance, the undersigned judges it opportune to state that though the names of a number of Junior Members are no longer found on the roll of the New York Chapter, they having been successively advanced to the Senior grade of professional membership, or having resigned on account of change of residence, or of occupation, or been dropped for non-payment of dues, twelve (12) names are retained of Juniors, of whose recent history or whereabouts he has not been kept apprised. He does not even know whether all or any of them are still living.

"What has transpired in the case of Juniors has been generally as follows: On a candidate being admitted to Junior Membership he has more or less frequented the Chapter quarters — sometimes quite sedulously for a considerable period — and read and copied from the books and periodicals in its library. After a while his attendance has diminished, although he has still, at intervals, come, sometimes applying to the undersigned for advice, and now and then, during emergencies, for apparently needful sympathy and assistance. Some of them have then drifted into other sections of the United States, or Canada, or elsewhere (and occasionally into other occupations), and after corresponding with the undersigned for a while have finally, amid new scenes and with presumably gathering cares and responsibilities, ceased their communications altogether, and the undersigned's knowledge of them has ended." The *Proceedings* of the Institute somewhere (perhaps those of fifteen or twenty years ago) show that the undersigned officially suggested some sort of regimen to meet such cases ("Roving Members" he called them) and to retain them, for their professional good, within the influence of the Institute, wherever located; but nothing came of his suggestion.

Your Committee have authorized your Treasurer to pay the annual dues, thirty dollars ($30), of the Chapter to the Fine Arts Federation, fifty dollars ($50) to the Treasurer of the General Committee of various bodies connected with the building-operations of the city, on the revision of the Building-laws initiated by the Superintendent of Buildings of the City, as the Chapter's share of clerical expenses,

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and ten dollars ($10) as its share of expenses of J. H. Pierce, delegate of the Associated Architectural Associations of the State of New York, in going to and from Albany to further the projected licensing of architects. The payments were promptly made.

Your Committee's last annual report stated its desire to secure illustrations of their work from members of the Chapter, for the adornment of the walls of its meeting and ante-rooms, and your Secretary has issued several times a circular-letter calling for such illustrations. It is only within a week or two, however, that the call has been honored by some half-dozen of the members: Messrs. McKim, Mead & White were the first to send in their examples, and next, Messrs. De Lemos & Cordes, and then Mr. R. H. Robertson, but your Committee hopes that their lead will be productive of like contributions from others, so that by the next meeting the walls will be completely covered with examples of the current designs of many of the most eminent practitioners of the metropolis.

The following ticket of Officers and Standing Committees for the calender year of 1897 was elected:

President, John M. Carrère; *Vice-Presidents*, R. H. Hunt and H. R. Marshall; *Secretary and Treasurer*, A. J. Bloor.

Executive Committee, E. H. Kendall and R. H. Hunt.

Committee on Library and Publications: Walter Cook, P. L. Le Brun and S. E. Gage.

Committee on Examinations: Napoleon Le Brun, R. M. Upjohn, A. J. Bloor, E. H. Kendall and R. W. Gibson.

The following ticket for the representation of the Chapter in the Council of the Fine Arts Federation was elected: *Representatives*, Chas. F. McKim, A. J. Bloor and H. R. Marshall; *Alternates*, A. W. Cordes, E. H. Kendall and W. R. Mead.

The Treasurer was requested to report to the Chapter on his views as to what economies, if any, could be practised, and as to what could be done to increase the Chapter revenue.

Messrs. Bloor, Carrère, Post, Gibson and Tryon were appointed a Special Committee of Consultation to report to the Chapter on the best means for increasing the efficiency of the Chapter.

Mr. Sturgis's gift of his "*European Architecture*" was accepted with cordial thanks, as was also the Secretary's gift of "*Five Sins of an Architect.*"

The meeting adjourned to the call of the Secretary.

A. J. Bloor, *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

FIRST PARISH CHURCH, BROOKLINE, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued with the International and Imperial Editions only.]

TRINITY MEMORIAL CHURCH, BINGHAMTON, N. Y. MESSRS. LACEY & BARTOO, ARCHITECTS, BINGHAMTON, N. Y.

THE exterior walls are of rock-faced Oxford blue stone and the roof is covered with red tile from the Celadon Terra-Cotta Co. The "Conosera" tile being the one used. The interior, including the trusses and ceiling, is finished in quartered-oak stained medium dark. The main aisle is tiled, as is also the chancel, and the altar is of white Caen stone executed by J. R. Lamb & Co., of New York. The cost of the entire structure will be about $50,000.

INTERIOR OF THE SAME.

A GROUP OF COTTAGES. MR. JOHN A. FOX, ARCHITECT, BOSTON, MASS.

A GROUP OF CHURCH DESIGNS. MR. J. A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.

COMPETITIVE DESIGN FOR CHRIST CHURCH, WALTHAM, MASS. MESSRS. CRAM, WENTWORTH & GOODHUE, ARCHITECTS, BOSTON, MASS.

IN this competition which was limited to these architects, Messrs. Hartwell, Richardson & Driver and Peabody & Stearns, the committee's choice fell on the design offered by the last-named firm.

[The following named illustrations may be found by reference to our advertising pages.]

DUMMER HOUSE, BYFIELD, MASS.

HOUSE ON ELM ST., NEW HAVEN, CONN. BUILT IN 1815.

A GROUP OF BELGIAN CHURCHES.

[Additional Illustrations in the International Edition.]

FRONT PORCH: FIRST PARISH CHURCH, BROOKLINE, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

NORTH PORCH AND DOOR OF THE SAME CHURCH.

[Gelatine Print.]

COATS' MEMORIAL CHURCH, PAISLEY, SCOTLAND. MR. HIPPOLYTE J. BLANC, ARCHITECT.

THIS Baptist Church, built in 1894 as a memorial to Thomas Coats, the great thread manufacturer, by his family, is of red stone and cost about £100,000.

SOUTH TRANSEPT OF THE SAME CHURCH.

INTERIOR OF THE SAME CHURCH, LOOKING FROM ALTAR.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

ADJUSTABLE FACING.

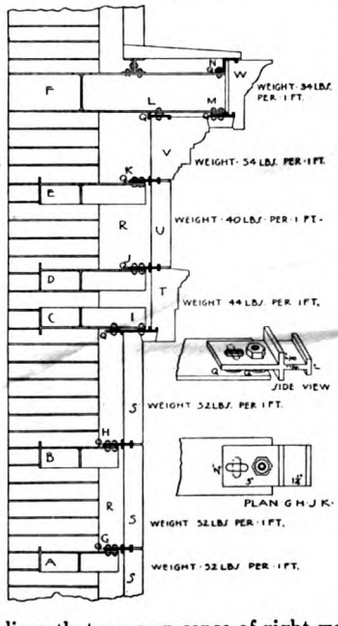
San Francisco, Cal., Sept. 22, 1896.

To the Editors of the American Architect:—

Dear Sir,— The interest with which an article of mine, recently published in the *Journal of the Engineering Societies*, has been received, and the suggestions made by many architects concerning its application and modification, prompt me to add a few lines through your journal on the subject.

I would like, first, to say a word from the æsthetic side of the case, the only point from which a criticism has been suggested. This suggestion of an objection being alone put into the scales against the practical possibilities, I will only suggest that a more careful investigation reveals this fact, that we are not asked to take part in any innovation. The art of facing walls with costly stone has been too long known to need further comment.

If I felt that I were trespassing upon a precept, or were invading a forbidden ground, forbidden by any law of truth in architecture, I



A, B, C, D, E — 2½″ x 3″ x ¼″, angle.
F — 6″ I-beam.
G, H, J, K — Ordinary form of anchor.
I — Special form of carrier.
M — " " " "
L — " " " clamp.
N — " " " "
O — Plan of *G, H, J, K.*
P — Side view of *G, H, J, K.*
Q — Washers or wedges, for adjustment.
R — Open space.
S — Ashlar facing.
T — Architrave.
U — Frieze.
V — Bed-moulding.
W — Crown moulding.

believe that my own sense of right would be quite enough without a further suggestion from another to turn me from its further pursuit. While I recognize the fact that an unhappy interpretation *might* put the stamp of falsity upon this form of construction, I am still sure that this need not be, and I know now, after the fullest discussion, that it *will* not.

In fact, the light of the lamp of truth seems not to bring out a

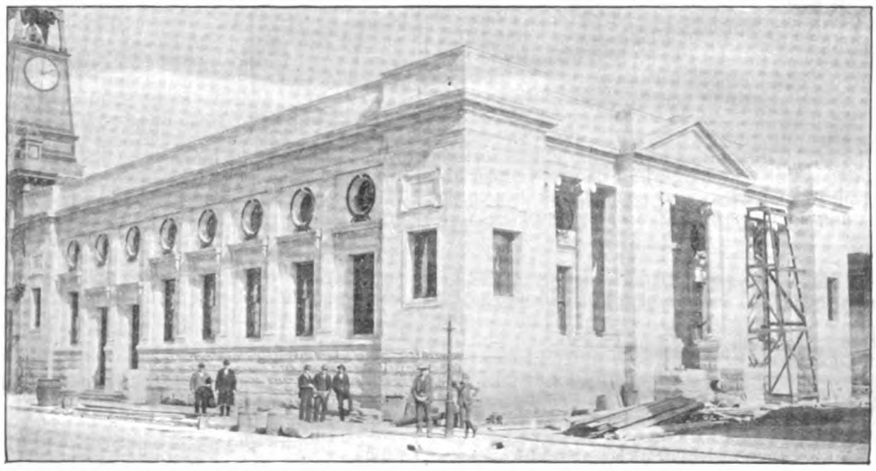
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wrong. John Ruskin says, in "*Seven Lamps of Architecture*," "but there is one form of architectural fiction which is so constant in the great periods that it needs respectful judgment. I mean the facing of brick with precious stone. It is well known that what is meant by a church being built of marble is, in nearly all cases, only that a veneering of marble has been fastened on the rough wall, built with certain projections to receive it, and that what appears to be massive stones are nothing more than external slabs. Now, it is evident that in this case the question of right is on the same ground as in that of gilding. If it be clearly understood that a marble facing does not pretend or imply a marble wall, there is no harm in it; and as it is also evident that when precious stones are used, it must become, not only an extravagant and vain increase of expense, but sometimes an actual impossibility, to obtain mass of them enough to build with, there is no resource but this of veneering; nor is there anything to be alleged against it on the head of durability, such work having been by experience found to last as long, and in as perfect condition, as any kind of masonry. It is, therefore, to be considered simply as an art of mosaic on a large scale, the ground being of brick, or any other material, and when lovely stones are to be obtained, it is a manner which should be thoroughly understood, and *often* practised."

The modern practical effort to minimize the weight of curtain-wall, and the consequent expense of the whole structure, has received too much consideration at the hands of the leading architects of to-day to make it even excusable to discuss at this time. I will only call attention to the fact that it is in this direction that I have had *my* aim, and in the individual consideration of the necessary element of a structural wall, I think will be found the highest form of construction.

These necessary elements I take to be strength and rigidity, fire-resistance and architectural character.

This theory applies with force to a modern steel-frame structure, enabling the free and independent handling of the three elements referred to. In an ordinary brick and masonry structure, the advantage of this separation is limited to a consideration of the advisability of treating separately the wall proper and the ashlar façade so as to effect security from unequal or unexpected settlement, protection against dampness, rapidity of construction, and economy in use of the more expensive material of façade. In the construction of a steel-frame building, we may add to these advantages the evident one of a general lightening up of the steel-work, consequent upon the limited weight of material of façade which it has to carry; a superior protection of the steelwork in the walls against fire, by means of the open space behind the facing, and the opportunity for a more independent prosecution of the work, which consequently enables the earlier completion of the building.



Public Library Building, Stockton, Cal.

After all, that which in this suggested form of construction seems a departure from modern usage is but directly in line with present methods, being merely a more frequent and positive interruption of the accumulating weight of the façade, thereby permitting the least thickness of masonry, the weight being transmitted to the structural wall by means of carriers and anchors, rather than at the floor beams, or sill beams. And, again, no credit rests, as an evolution of a new idea, on the feature of an independent facing. The carriers and anchors as used in the released form of construction are simply superior to the old way of building the wall and facing together.

The accompanying sketch shows a section of the main cornice of Public Library Building, at Stockton, Cal.

This building stands on a corner and it has exposed about 210 feet of frontage, the whole of which is white marble, on a light gray granite foundation-wall of 7 feet. The structural walls are of brick, 24 inches in thickness. The whole of the work on this building, except the finishing-coat of plaster, and the interior woodwork, was completed before the marble for the façade was delivered upon the ground. The whole cost of the exterior marble-work was less than $17,000, in which is included not less than $3,000 for carving, and the cost of six monolithic columns 16 feet in height. It was hardly thought possible to complete this building within the appropriated sum. This was safely done, however, and no uncertainty in the success of the method of construction has been suggested during its progression or since completion.

A comparative estimate of the amount of marble used in this work against what would have been necessary had the ordinary form of masonry construction been used, will show that less than one-third of such estimated amount was required. No difficulty was encountered in any part or feature of the work, unless it might have been the indisposition of the stone-setters to see their work laid out for them, course by course, to the top of the parapet-wall. In fact, the appropriation by the superintendent of the work, or an engineer, of the setting of all lines and levels of the stonework is a feature which has been noted by a number of architects, with satisfaction, a Boston gentleman making the remark to me, after fully understanding this possibility, that, could this be done, he should then feel as if the work were half set; and, indeed, the possibility of error, or uncertainty, is practically removed when carriers have been adjusted to exact alignment and plumb-line, and I will unhesitatingly state this as the proper plan to follow, in the use of this construction: to adjust and set, by an engineer, every line on the work, both of level and of plumb, to the figured drawings, before calling upon the stone-setter.

I will state that at one time during the progress of the work upon the Library Building, there were men at work at no less than eight different points, and on three different levels, and there was not, nor could there be, a discrepancy, or uncertainty, at any meeting-point. Every stone sent to the staging as correct in size was set without trimming, in fact, fitting and trimming were not known upon the staging. The only cutting known to have been done in the work of setting, was the small amount of channelling required for the carriers, and this work hardly occupied the time of one workman, and he not skilled.

When the difficulty of keeping to a level in every-day work is remembered (and who cannot remember in his own experience some perplexity thus encountered?), I think the avoidance of this one care may be appreciated. In the matter of settlement of an ordinary wall, and the uneven settlement in a composite wall, in the brickwork and stonework, some one has remarked that my estimate, quoting from the *Engineering Journal*, "Sometimes as much as ¾ inch in 10 feet" was too strong — that it *should* not be ⅛ inch. Granting even this estimate, I was pleased to know that *all* settlement, or its effect, was removed in the construction of the Library Building, the walls being set and dry before the work of facing was begun.

More than usual care was taken in the construction of the Library Building, to keep the course lines of the brickwork level, but the irregularity of alignment of anchors was found to average ⅜ inch, thus proving at once the impracticability of the proposed independent façade, without means of securing a perfect alignment. The same difficulty exists, although possibly not to so great a degree, in keeping a wall line plumb, and this is known to careful observers. This plumb-line is also set by the engineer, and made ready for the stone-setter from grade-line to cornice.

The advantage of preventing the penetration of moisture in a wall of the structure hardly needs discussion, while in our practice in the less formidable climate of the Western coast, we understand it; yet I confess, until I had been told by Eastern architects that they had seen rain driven through an ordinary wall, I should hardly have credited it. The absolute prevention of this danger may be assured.

Quite a little discussion has ensued upon the advisability of filling the open space behind the facing with some material calculated to preserve the desirable effect of this open space in the event of fire. I am, however, not yet convinced that a filling, even of a material expected to resist a great degree of heat, will have, so certainly, the effect of protecting the steel work, as the clear open space. I believe, as I have from the first, that the open space will more fully meet this question than the proposed filling. However, I will suggest that this filling, if used, be grouted into the space, and allowed to so set, forming practically an integral wall. This point, however, may be safely left, with many other modifications which may be made, to individual consideration.

JOHN LOUIS PELTON.

NOTES AND CLIPPINGS.

MEASURING THE INTERIOR OF BUILDINGS. — A simple method of measuring heights in the interior of churches and other buildings consists in attaching a graduating string or tape to a small balloon such as is easily obtainable anywhere. This method might also be readily applied for measuring the height of caverns. — *Prometheus.*

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Little Hope for the Goncourt Academy. — The realization of the philanthropic plans of the late Edmond de Goncourt seems to be fraught with difficulty. His scheme for the foundation of an academy, for the establishment of which he left his large fortune in trust to the novelist, Alphonse Daudet, and to Léon Hennique, has from the outset been regarded as impracticable, and appears now destined to become entirely impossible. In making his will Edmond de Goncourt expressly declared that he only bequeathed his fortune in trust for the foundation of a Goncourt Academy, on the lines of the French Academy, because his nearest relatives were exceedingly well off and plentifully endowed with the goods of this world. A claimant to the fortune, however, has appeared in the person of an indigent widow at Marseilles, named Mme. Adam, whose father, a man of the name of Guerin, was the only brother of Edmond de Goncourt's mother. The claimant is, therefore, the first cousin of the testator, and as such, his next of kin. Her husband was a merchant's clerk, who left her nothing at his death, and she has since supported her two daughters by giving lessons as a daily governess. Now, the entire will being based upon the false and erroneous supposition that the next of kin are in affluent circumstances, that in itself is sufficient to constitute a legal ground for contesting it, and this forms the first and foremost of the reasons put forward by Mme. Adam's lawyers for securing the injunction to prevent the executors from disposing of the property. But there are other grounds for contesting the will. It is expressly stipulated by French law that no property can be bequeathed to any organization or institution that is not already in existence, legally constituted and recognized by the State. The Goncourt Academy comes under this category. Another French law, namely, Clause 910 of the Civil Code, debars a testator from bequeathing the entirety of his property to any public or private institution or corporation as long as he has any living relatives, no matter whether they are of legitimate or illegitimate birth. This, therefore, constitutes a third ground for contesting the will. Moreover, Alphonse Daudet and his associate in the affair, who are recognized as trustees for the foundation of the academy, have been compelled to admit that its conception, as described in the will, is of such a hazy character as to render its realization upon the lines indicated by De Goncourt impracticable. They make this acknowledgment with all the more regret, as the bequest provides for an annuity of some $1,500 or $2,000 to each of the ten members of the projected academy. Should the various courts of appeal decide against the claimant, which is altogether improbable, she has, according to French law, the right to bring the matter in final resort before the Council of State, which will have to pronounce its opinion upon the affair before anything can be done. All this legal procedure will take, not months, but years, and, inasmuch as neither Daudet nor his fellow-trustee will care to risk the heavy legal expenses in connection with the affair, it is probable that the entire fortune will be quietly surrendered to the claimant, whose lawyers under the circumstances, have been well advised in recommending her to decline to agree to anything in the shape of a compromise. — *N. Y. Tribune.*

New York's 15,000 Hall-Bedrooms. — That which distinguishes this city from all others is the hall room. London has nothing like it, nor has Paris. They do not exist in Boston, or yet in Philadelphia. The typical New York house has five; there would be six but that the space for one has been appropriated by the bath-room. There are three hundred on each cross-town block. In a solid section extending from Washington Square to Fifty-ninth Street, and within the limited confines of Fifth and Sixth Avenues, there are, roughly estimated, fifteen thousand hall-bedrooms. Taking this as a unit of measurement, the alert mind can readily figure the hundreds of these coffin-like enclosures that rise tier on tier on Manhattan Island. The moral and social significance of the hall room is even more impressive. The manifest destiny of a New York house is that, sooner or later, it shall become a boarding-house. The history of block after block enforces this view. In that case, to the poor, the lonely, the forlorn, the hall room will fall. Of this the architect, the plumber, the gas-fitter, seem to have had prescience. The water-pipe ignores it; the slenderest rill of gas alone enters it; the steam-pipes hurry by it; the tin furnace-pipes go out of their way to avoid it. No register opens genially upon it. It has never known a flue of its own, or cheerful grate, or sullen stove. Even the range flue will stretch its warmth-giving length in any other part of the house in preference. In summer it is hot and stifling. In winter it is cold and cheerless. In all seasons it is either unventilated or swept by perilous draughts. It is the Pariah of the community of rooms, the Cinderella of the domestic roof. — *Mary Gay Humphreys in Scribner's.*

Inelastic Flooring. — A manufacturer says that the nature of the floor of the shop has a great deal to do with the amount of work that is got out of the operative staff. He was once struck by the difference in the apparent activity of two sets of men working on similar jobs at the vise in two rooms of a large shop. One was in an old building, and the other was in one of recent construction. In the former the men stood easily and naturally at their work, and showed no symptoms of a hankering for a seat on the bench, while in the latter the men were shifting their weight from one foot to the other, throwing one leg upon the bench at every opportunity, and showing every evidence of foot fatigue. The superintendent guessed that the difference was due to the floors upon which the two gangs were standing. In the old shop the floor was of wood, springy to a certain extent, and a poor conductor of heat. In the new shop it was of the most beautiful concrete, an excellent conductor of heat from the feet of the workman, and as unyielding as granite rock. So, the benches in the new shop were raised a couple of inches and each man was given a platform of wood that rested on two crosspieces at the end, and had a slight spring to it. The foot weariness disappeared almost at once, and no further trouble was experienced. Which shows that the prettiest floor is not always the best for the workman. — *San Francisco Chronicle.*

Ecclesiastical Wit. — Ecclesiastical wit and residences are often of a very high order. Few things have been better than Sydney Smith's famous recipe for the proposed wooden railing around St. Paul's: "If the Dean and Chapter would only put their heads together the thing would be done." — *London Standard.*

The Domes of St. Mark's, Venice. — The church of San Marco at Venice, built in the tenth century by order of Pietro Orseolo, the then doge, is decorated with five domes. One of these, placed in the centre of the church, is much larger than the others. Each dome is enclosed within four pieces of semi-cylindrical vaulting, together forming a square, in the angles of which are four corbels, which gather-in the circular base of each dome. The lower part of the dome is pierced with small windows. The interior is covered with mosaic, and the top of the dome is terminated with a finishing on which is a cross. In 1523 the doge, Andrea Gritti, caused the domes to be repaired, and Sansovino, the architect, restored in a great measure the supports, and placed (at about one-third of its height) a great circle of iron round the large dome to prevent its falling, a precaution which has been completely successful. The other domes are not so well preserved. In 1729 one of the smaller domes was in danger of falling from the decay which had taken place in a circular bond placed at the base of the dome. Stone was, however, substituted for the wooden bond, and a circle of iron placed without the dome near its base. In 1735 Andrew Tirali, the architect to the church, placed an iron circle round the dome which is near the great gate, on account of some small fractures which were then perceived. — *The Architect.*

The White House. — "There are a number of stories in circulation going to show why the Executive Mansion was called the White House, and by whom it was first called such," said a local historian, "but I think the best evidence tends to give that credit to James Madison, who was the fourth President, and who was driven out of the Executive Mansion when the British burned it in 1814. The Executive Mansion is built of freestone, which was quarried down on the Potomac River. The Capitol proper was constructed out of the same stone, though, of course, the wings for the Senate and House of Representatives are built of marble, with granite foundations. At the time the British burned the Executive Mansion they did a lot of other damage, and the country was pressed for money to repair the same. The walls of the mansion were but little damaged, other than being blackened by smoke. As I said, money was scarce, and Congress made an appropriation to have the outside of the house painted. White was selected as the best color. The Capitol was not painted for nearly twenty years afterward. Madison, in a letter to a personal and political friend, wrote: 'Come in and see me any time. You will always find me in at the White House.' The Executive Mansion may have been called the White House before that, but I have never been able to find any record of it. The letter from Madison had an important political bearing and was very extensively circulated. If, therefore, Madison did not officiate at the christening, he certainly took a prominent part in publishing the fact that the White House was forever, from that time, to be the name of the mansion. Up to that time the Executive Mansion, which is the legal name for it, was generally spoken of as the 'President's house.'" — *Washington Star.*

Boards of Appeal. — The resolution passed by the National Association of Builders at its Buffalo convention, advising local associations to agitate for the appointment in their several cities, of Boards of Appeal similar to that established in Boston, has, no doubt, created interest in the nature and functions of the Boston Board. Briefly it may be stated that an amendment to the building laws of Boston was passed two years ago, establishing a Board of Appeal consisting of three members — one appointed by the Mayor of the city, one by the Boston Chapter of the American Society of Architects and one by the Master Builders' Association, the Mayor having power to remove any member for malfeasance, incapacity or neglect of duty. The duties of the Board are to hear appeals from the decisions of the Inspector of Buildings, who is equivalent to the Superintendent of Buildings in New York City, and to construe the language of the decisions rendered by the Inspector whenever called upon to do so by any citizen of Boston in a prescribed form. The Board is endowed with discretionary powers in the matters of construction and the use of materials, and with the necessary authority to enter buildings, etc. Its decisions are final. It is in some respects like the Board of Examiners created under the New York building laws, but with enlarged responsibilities and more complete powers. The Board of Examiners is better constructed, in that it contains a wider experience, and consequently better judgment, and is more adapted to the requirements of New York City; but the idea of a competent body having authority to decide all disputes with the single head of the Department of Buildings is one that is quite worthy of consideration. The time for taking up this question is opportune, inasmuch as a new charter is being framed for Greater New York, and a representative and able committee is at work upon the revision of the building laws. There is one thing that might make busy men hesitate to give their time to this particular matter, and it is the current report that the form of Government which the Greater New York Commission will eventually recommend to the Legislature for the Department of Buildings, as well as for the other city departments, is the bi-partisan commission The Board of Appeal is said to be working very successfully in Boston, and that one of the causes of this success is that the method of its appointments takes it out of politics and provides for a thoroughly practical and efficient tribunal to whom all questions of doubt as to the construction of the law by the Inspector of Buildings may be referred. Undoubtedly a tribunal of this character is absolutely necessary to the satisfactory operation of the Department of Buildings, and this fact ought to be strongly impressed upon the Greater New York Commission and upon the Legislature. — *Record and Guide.*

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ANOTHER bill to restrict the height to which buildings may be carried in New York is likely to be introduced in the Assembly at Albany this winter, and it seems quite probable that it may pass. The *Evening Post*, in speaking of it, mentions certain considerations which will weigh in favor of restriction, and which are daily becoming of more importance. Among these is the circumstance that the erection of lofty office-buildings in New York is by no means as profitable an operation as it was a few years ago. It is well known among real-estate agents that the "office population" in New York, as in other large cities, does not increase rapidly, and the supply of new offices has of late very much outstripped the demand. It is true that the attractive offices in the new fire-proof buildings draw tenants from the old ones, but the supply even from this source is running short, and the *Evening Post* says the total rental of some of the new "sky-scraper" buildings is less than half what it was when they were first erected, a very few years ago. As the cost of maintaining a building of this sort, including that of fuel, elevator and janitor service, care and repairs, is just as large when the rents are low as when they are high, there is now little inducement for owners of land in anything but the most favored locations to risk large sums of money in what may be a losing speculation, and the owners of land in such less favored localities, instead of opposing a restrictive bill, as they have done hitherto, are likely this year either to cease opposition, or to advocate its passage, for the very good reason that if a building of moderate height is the safest investment for them, they will be much surer of getting tenants for such buildings if the competition of the "sky-scrapers" is checked. In Chicago, in the same way as in New York, the mania for lofty structures raged for a few years to such an extent that enormously high office-buildings, erected in situations where there was no demand for offices, have been let for storage ever since their completion; and the lesson seems to have been so far taken to heart there that little opposition was made to the severe restrictive law now in force there.

IF the people who thought, a year or two ago, that they might like to build a twenty-five story office-building on their land, have really moderated their ideas so far as not to oppose actively a statute to restrict heights of buildings, the law ought to pass without difficulty, for the owners of existing high buildings are, of course, unanimously in favor of a restriction which secures to them their monopoly, while, among the disinterested people, the architects, fire-engineers, building-inspectors and health-officers are pretty well agreed that restriction is necessary in behalf of the public. Of course, the prospect of the passage of such a bill would lead to the hurried starting of many "sky-scrapers" by people anxious to take advantage of their last opportunity; but this could not be avoided in any case, and it is safe to say that, of the plans of the kind hurried through the building department, a good many would never be carried out, while the owners of some of the buildings really executed would bitterly repent their haste.

SINCE the publication, some two years ago, of Professor Greenleaf's curious paper on "Window Lights," in the *Popular Science Monthly*, a good deal of attention has been paid to the subject of reflected light, and the relative value of light from the sky, and the reflected rays from different substances, has been carefully observed. In these days of lofty buildings, many rooms and offices in our cities never receive anything but reflected light, and the quality of that reflected light is of the utmost importance. To a banker, for example, occupying a first-story office on a narrow street, with a twenty-story building opposite, the color of the twenty-story building is a serious matter. If it is of dark red brick, or dark stone, his office will be dark all day long, his clerks will have to work by artificial light, and his customers will go away with a feeling of dislike to the gloomy rooms, which is very likely to result in the transfer of their business to houses occupying more cheerful quarters; while, if the opposite structure is of marble, or light-colored stone or brick, the brightness of the light reflected from it will add greatly to the attraction of bankers premises. In one new building that we know of, in a narrow street, the front is entirely of white enamelled brick; and it is well worth considering whether the owners of structures more than six stories high should not be compelled by law either to paint them with an enamel paint, which the rain would wash, or to face them with light-colored brick or stone.

THE New York papers give, incidentally, warning of a scheme which we hope will be nipped in the bud by the courts. It seems that the labor troubles which some one has been successful in getting up on the St. Paul building have revived the energies of the Board of Walking Delegates, which had rather drooped since the election. At a meeting of these functionaries the other day, it was resolved to "extend the strike" to another large building which is being erected by the same contractor, and attempts are being made to get some of the workingmen's organizations, which reject the authority of the Walking Delegates, back into the fold. Among these stray sheep is the Plumbers' Union, and, according to Delegate Henry, of the Board of Walking Delegates, as his words are reported in the *Times*, the Master-Plumbers' Association is not only willing, but anxious, that the journeymen's union should return to its allegiance. Why the master-plumbers should wish to see their men placed again under the authority of an organization which has tormented New York employers in many cases into bankruptcy, and in some into their graves, is not very evident, but the clue to the mystery can be gathered from what follows: "The members of the Master-Plumbers' Association," we are told, "and their union journeymen have a contract that the former should employ only union men, and the union men, on the other hand, will work for none but members of the Master-Plumbers' Association. Should the Plumbers' Union return to the Board of Walking Delegates, the latter will order general strikes against all non-union plumbers, wherever they may be found." The interpretation of this is plain enough. The members of the Master-Plumbers' Association and the Plumbers' Union have found that their arrangement, by which the former hoped to exclude competition by preventing master-plumbers outside of their own number from getting competent men to work for them, while the latter hoped to prevent non-union plumbers from getting employment, does not work so well as they had wished, and that there are some plumbers, both masters and men, who are earning an honest living by doing plumbing work without asking their leave; and they, or some of them, have taken it into their heads that it would be a good thing to invoke the

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fearful power of the Board of Walking Delegates to aid them in crushing their rivals. Of course, the price of such assistance would be their own submission to the tyranny from which they have only recently extricated themselves, but people who call upon Satan to aid them in their quarrels with other people seldom think how the prongs of his trident will feel when he turns it against them afterward. Meanwhile, the poor people who imagine that American liberty applies to plumbers in New York have a hard lesson in store for them, for if the Walking Delegates, in concert with the Plumbers' Union, and the Master-Plumbers' Association, carry out their plans to "order general strikes against all non-union plumbers, wherever they may be found," there will be nothing for non-union plumbers to do but go to the almshouse with their families.

ONE of the aspects of the park question, which is now being discussed, relates to the value of park lands as an investment for public funds. The City of New York, for example, has about five thousand acres of land devoted to parks and squares. For this land about thirty millions dollars have been paid, but it is said that the City Hall Park alone, containing about eight acres, would bring nearly or quite that amount, if put on the market, and that the total salable value of all the parks would be at least ten times their cost. It may be worth while to point out that this way of looking at the matter is misleading, for the simple reason that the park lands cannot be sold. That they have been well worth their cost, in the increase of taxable value of the property around them, is undoubted, but municipalities, in considering park systems, should consider this increase of value, rather than the possible selling at a profit of land once taken for park purposes. Under ordinary circumstances, land taken for parks is forever dedicated to public use, and could not be sold for building, and it is hardly necessary to say that a park laid out under such conditions that it might be cut up later and sold, would be anything but an attraction to property-owners, and the valuations of land in its vicinity would be lower, under the uncertainty as to the future destiny of the territory, than they would be without any park.

REGARDED as an undertaking for the perpetual benefit of the public, the laying out of parks is a matter to which too much time and thought cannot be given. In nearly all cases, the establishment of parks is the work of land speculators, following their private advantage, without regard to that of the public. The moment a public demand, stimulated or suggested, in many cases, by the speculators themselves, finds expression in the newspapers, a dozen rival syndicates begin to urge the "claims" of their respective plans, each having a tract of land, of which they would like to sell a portion to the municipality, at a good price, and the rest to investors, at a value greatly enhanced by the neighborhood of the new pleasure ground. There is no end to the absurdities of these eager schemers. We once knew a case where a plan was extolled for weeks in the local papers, and strongly urged upon the municipal government, for buying for a "park" a portion of a large tract of forest land, whose principal claim to distinction lay in the fact that wild-cats were occasionally killed there, while one of its few inhabitants, commenting on the argument, which is universally made in such cases, that "the value of the land is rapidly increasing, and it must be secured before the cost becomes prohibitive," observed that he, for one, would be glad to sell his land for less than had been offered for it forty years previously. In this instance the scheme was so obviously ridiculous that it fell through, but many another, perhaps as foolish, is, by means of political and other influences, carried out at the expense of the public.

THE true way to lay out parks is to do so without any assistance from speculators, or any notice to them, employing only the aid of expert park designers. After these have thoroughly examined the ground, and made their sketches, the Commissioners, or whoever may be charged with representing the municipality in the matter, should consider what important interests, if any, will be affected by the plan; and, after the necessary modifications are made, the design should be carried out to the letter, without paying the slightest attention to the howls and execrations, the flatteries, cajoleries, wire-pulling or threatening of the swarm of speculators which will be aroused by its publication. It was in this way that the matchless chain of parks adorning Boston was designed, and two open sewers with their banks converted, without any help from speculators, into the brightest and most attractive of driveways, leading for ten miles through what will be in a few years the heart of a great city; yet the cost of the Boston park system has been less by many millions than that of most city parks of equal area, while its effect in improving property values in the neighborhood promises, on account of its extended perimeter, as well as its natural beauty, to be very great.

NOTWITHSTANDING the collapse in value of shares of the Acetylene Company, which, after being quoted at four hundred dollars, are said to have been recently sold for fifty cents, acetylene has a certain future before it. For obtaining a brilliant light, under circumstances where no other light would be available, it offers peculiar advantages, and, as appliances for utilizing it are improved, it seems reasonable to anticipate its increasing use. Meanwhile, architects, who are quite likely to be consulted in regard to the introduction of fittings adapted to it, will do well to bear in mind the conditions under which it can be safely employed for illuminating purposes. The most important of these is, undoubtedly, that neither the gas, nor the calcium carbide, nor the water which is used to generate the gas, should be allowed to come in contact with brass or copper in any form, in pipes, fixtures, valves, or otherwise. On the first introduction of calcium carbide as a gas-producing material, the French and German chemists called attention to the fact that acetylene forms with copper a highly explosive compound, the acetylide of copper, and iron burners must be used with it. Some of the people interested in the acetylene speculation ridiculed this notion. It was asserted, with the usual confidence of speculators, that no such action could take place in the ordinary use of acetylene in brass gas-fixtures; and when certain occurrences cast doubt on the correctness of this theory, it was asserted that, in any case, chemical combination of the gas with brass or copper could take place only where the metal was already corroded. Even chemists were for a time misled by this notion, but it is now certain that the commercial acetylene, as produced from calcium carbide, acts vigorously on clean surfaces of brass and copper, producing the characteristic explosive compounds. A few weeks ago, an English chemist, a manufacturer of compressed oxygen for the trade, who had long been experimenting with acetylene, was using a steel cylinder for receiving the gas, which was led into it through new copper pipes with new brass fittings, when a violent explosion took place, accompanied with a flash of light. Fortunately, no one was injured, and, on examining the pipes and fittings, they were found deeply honeycombed on the inside, evidently from the action of the gas. The steel cylinder was, of course, not corroded, but was found to be lined with a coating of soot, showing that the explosion was produced by spontaneous decomposition of the gas, and not by excessive pressure. A similar indication was given in an accident in France, where a cylinder of compressed acetylene exploded in the street, killing a man, whose body was found covered with fine carbon dust, evidently produced by the decomposition of the gas. The explosion which took place in Connecticut some months ago was probably due to the same cause as the others, although it has never been scientifically investigated, so far as we know. It is said, moreover, that commercial acetylene is often contaminated with phosphorus. What the phosphorus could be derived from is not very clear, but it is hardly necessary to say to any one who has seen the bubbles of phosphoretted hydrogen flash up on emerging from the water in the familiar lecture-room experiment, that compounds of phosphorus and hydrogen take fire spontaneously on contact with the air.

MR. G. W. G. FERRIS, the designer of the famous Ferris' Wheel, which formed one of the most popular of the outside attractions at the Chicago Exposition, died a few days ago in a hospital in New York, of typhoid fever, brought on in part, it is said, by anxiety over business matters. Mr. Ferris was born in Galesburg, Illinois, and graduated from the Rensselaer Polytechnic Institute, at Troy, as an engineer. After several years' practice as an assistant, he began business on his own account as what might be called an inventing engineer. The Chicago Exhibition suggested to him the extraordinary plan which he worked out with such signal success, and which is said to have brought him a fortune.

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STATICS OF STRUCTURES. — THEORETICAL AND APPLIED.—I.

INTRODUCTORY. — SIMPLE BEAM WITH UNIFORM LOAD.

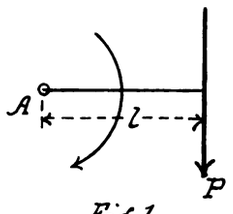


Fig. 1.

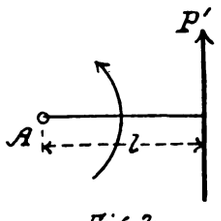


Fig. 2.

1. It is the purpose of this science to investigate the conditions under which the forces acting upon any body will be in equilibrium.

A *force* is fully defined when its amount, position and direction are known. Its direction, together with a point through which this direction passes, gives its position.

Forces may be divided into two classes: those lying in the same plane, or *co-planer forces;* and those lying in different planes, or *non-co-planer forces.*

2. It is apparent from these definitions, that a force may be represented graphically, the paper being the plane, the force a straight line, drawn to a scale of so many pounds to an inch, with perhaps an arrow at one end to indicate the direction in which it is acting.

3. *The moment of a force* about a point is the product of the amount of the force (taken in pounds) into the vertical distance (taken in feet or inches) of the force, or the line along which it acts, from that point. The moment is, therefore, spoken of as so many foot-pounds, or inch-pounds, as the case may be: it is a compound quantity.

4. The moment of a force may also be taken about a line or plane. Thus, in Figure 1, the moment of the force P about the point A is $P\,l$.

It is evident that P will rotate about A, always remaining at the distance l from it, unless a counterforce is applied, equal and opposite in direction to P. This counterforce would act as shown in Figure 2. It will be noticed that P, in Figure 1, rotates in the direction taken by the hands of a clock; and that P' (Fig. 2) turns in the opposite direction. To distinguish between these two the moment in Figure 1 is said to be a positive quantity, $+P\,l$; and the other is called $-P\,l$.

5. This is very important; and the reader, to be able to readily understand the following discussion, or, in fact, any problem in statics, must train himself to see at a glance whether a moment is positive or negative, or, as may be said, whether it is right-turning or left-turning.

6. In the case of a beam, as well as of structures of a more complicated nature, part of the exterior forces acting upon them are given, and are then known as *loads*, while others, which are to be found, are called *reactions.*

7. When a load acts upon an object continually, it is known as a *static*, or *dead load*; when it acts only occasionally, it is known as a *live*, or *moving load.* Thus the weight of a roof-truss would be the static load, while the wind or snow would be the live-load on it; in the case of a bridge, the whole weight of the construction would be the dead-load, and a crowd of people, vehicles, or a train would be the live or moving load; and so on.

8. A load acting only on one point is called a *concentrated load*, to distinguish it from a *uniformly distributed load*, which acts on a line, or an area.

9. When external forces are applied to a body they cause a *strain* of that body, or, rather, of the molecules of which it is composed.

These molecules resist the tendency to separation caused by this strain, and in so doing give rise to an interior force known as *stress.*

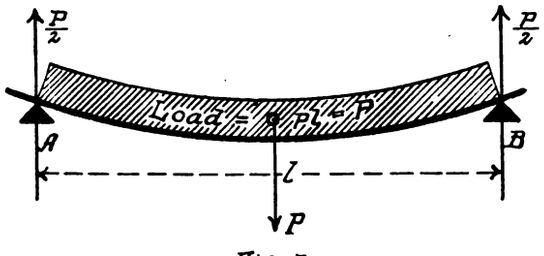


Fig. 3.

That is, stress is caused by and resists strain. Stress results from forces in the body, strain from forces outside of the body. The widest differences exist among the definitions of strain and stress as given by the several authorities. Some call strain the *distortion* of the body caused by the application of external forces; it ought, therefore, to be measured in units of length and not weight; this is, however, commonly not done.

10. We have now defined a sufficient number of preliminary terms to begin to study the influence of a uniformly distributed load on a beam freely supported at both ends; we shall take the beam $A\,B$ (Fig. 3) with a span of l feet and a load of p lbs. per foot, or a whole load of $p\,l = P$ lbs. Let us assume the load P large enough to cause the beam to deflect, as shown; in so doing, the molecules composing the beam must have been forced to change their position. This is really the case: strains and stresses have been at work; the molecules of the upper half of the beam have been crowded together, while those of the lower half have been separated, so to speak. Or, the load has caused a *compressive strain*, or simply *compression* — resisted by a *compressive stress* in the upper half of the beam, and a *tensile strain*, or simply *tension*, resisted by a *tensile stress* in the lower half.

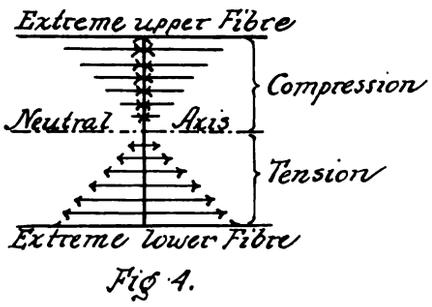


Fig. 4.

As soon as these compressive and tensile strains grow greater than their respective stresses, the beam will break or fail.

11. If we were to take a cross-section of the beam, and examine the stresses existing there more closely, we should find the compressive stress greatest at the *extreme* upper edge or *fibre* of the beam, gradually growing less as we neared the centre, at which we should find no stress whatever; below the centre we should find a tensile stress, growing gradually as we neared the *extreme* lower *fibre*, at which we should find it to be a maximum. We have attempted to show this in Figure 4, indicating the cross-section by a vertical line, the compressive stresses by forces directed toward the section, and the tensile stresses as forces pulling away from it. At the centre, or rather in the plane passing through the centre parallel to the extreme fibres, and regarded as of infinitesimal thickness, there is neither tension nor compression. This plane is called the *neutral plane;* and its line of intersection with the plane of any cross-section taken through the beam is called the *neutral axis* of that cross-section.

The neutral axis of a cross-section may lie in any direction; but it is usually assumed through the *centre of gravity* of the cross-section, and separates all the fibres in compression from all those in tension.

12. It has been found that the amount of the stresses of the different fibres varies directly as their distance from the neutral axis; the stress in the fibres farthest from the neutral axis being greatest, the stress at the neutral axis itself being naught.

In designing a cross-section, we need, therefore, only be sure that the extreme fibres will be able to resist the given strain, there being no doubt about the other fibres in that case, as they are strained less, while their resistance is just as great as that of the extreme fibres.

It will occur to the reader that for this reason iron beams are rolled in the shape of an I; thereby putting the greatest amount of metal just where it is most needed, *i. e.*, at the top and bottom.

13. In the foregoing paragraph we had occasion to refer to the *centre-of-gravity;* this, as the reader undoubtedly knows, is that point of a body at which its entire "weight" seems concentrated; or, if the body is supported at this point, or along a line passing through it, no matter what its position otherwise may be, it will balance or be in equilibrium, so long as it is only acted upon by the force of gravity.

In another chapter we shall again take up the neutral axis, together with other things of a similar nature; the above will be sufficient for our present purpose.

14. Returning to our uniformly loaded beam $A\,B$, we shall now take the moments of all the external forces — on one side of a cross-section — about the neutral axis. The algebraic sum of these moments is known as the *bending-moment* of the beam. It varies

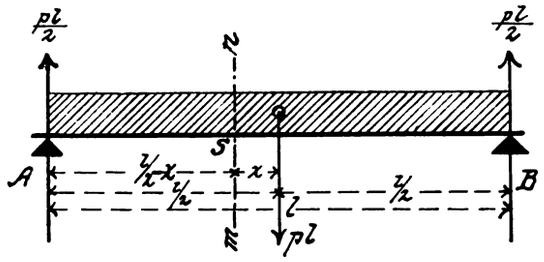


Fig. 5.

with the position of the cross-section, according to a law which can be easily deduced.

15. The exterior forces acting upon the beam are the load $p\,l$ (p pounds per foot, the span being l feet), and the reactions A and B (See § 6).

The reader knows that a force applied to any body causes a counterforce, or *reaction*, in that body. If the body is to remain in

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equilibrium, *i. e.*, if its "state of motion" (considering "rest" as one state) is not to be changed, this reaction must necessarily be equal and opposite in direction to the force applied. In structures, the direction and position of the reactions vary with the manner of loading and supporting.

In the case under consideration, the beam being supported freely, that is, not hinged or fastened in any way to its abutments; the

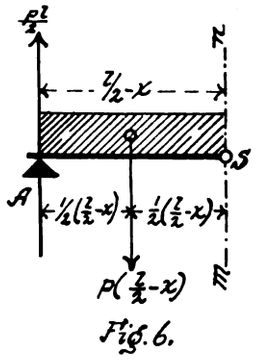


Fig. 6.

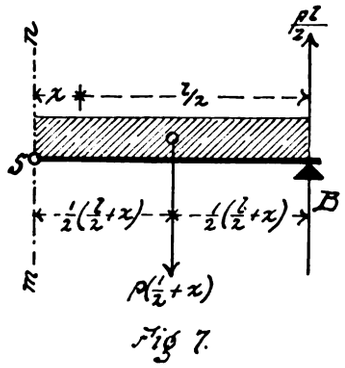


Fig. 7.

reactions at A and B will be vertical and each will be equal to one-half of the entire load $\left(\frac{p\,l}{2}\right)$.

16. Let us assume a section, $m-n$, at the point s of the beam (Fig. 5), at a distance x from the centre, and regard only the left portion of the beam, $A\,s$ (Fig. 6). We shall now take the moments of all the external forces acting upon this portion about the point s, calling their algebraic sum M.

17. We have, first, the reaction $\frac{p\,l}{2}$, rotating about s at the distance $\frac{l}{2}-x$ in the direction of the hands of a clock; its moment is, therefore: $+\frac{p\,l}{2}\left(\frac{l}{2}-x\right)$.

Then we have the load $p\left(\frac{l}{2}-x\right)$, acting upon the beam at a distance $\frac{1}{2}\left(\frac{l}{2}-x\right)$ from s and turning in a direction opposite to that of the foregoing; its moment about s is therefore:

$$-p\left(\frac{l}{2}-x\right)\tfrac{1}{2}\left(\frac{l}{2}-x\right), \text{ which equals } -\tfrac{1}{2}p\left(\frac{l}{2}-x\right)^2$$

Therefore, the entire moment is:

$$M=\frac{p\,l}{2}\left(\frac{l}{2}-x\right)-\frac{p}{2}\left(\frac{l}{2}-x\right)^2$$

By performing the operations indicated, this becomes

$$M=\frac{p\,l^2}{4}-\frac{p\,l\,x}{2}-\frac{p\,l^2}{8}+\frac{p\,l\,x}{2}-\frac{p\,x^2}{2}$$

which can be simplified to

$$M=\tfrac{1}{8}p\,l^2-\tfrac{1}{2}p\,x^2. \qquad (1)$$

18. This, then, is the equation which gives the bending-moment at a point any distance, x, from the centre of the beam.

It is evident that M will be a maximum as soon as x becomes zero, for then the last term of the right-hand member of the equation vanishes, which becomes

$$M=\tfrac{1}{8}p\,l^2 \qquad (2)$$

This is the equation of the maximum bending-moment; it occurs at the centre of the beam, for there $x=0$.

On the other hand, M becomes a minimum when $x=\frac{1}{2}\,l$, for then the right-hand member of the equation vanishes, which shows that the bending-moments at the points of support are naught.

It will be well to insert here that in all of these equations p is the load in pounds per foot, while l is the span in *inches*, so that M is expressed in inch-pounds. The reason for taking l in inches instead of feet will become evident farther on.

19. It was said above, that the bending-moment is equal to the moments taken on *one* side of any cross-section; we have just taken them on the left side of the section $m-n$; let us now take them on the right side, and compare results.

We have (Fig. 7) first: the moment of the load (taken about the point s) equal to $+p\left(\frac{l}{2}+x\right)\frac{1}{2}\left(\frac{l}{2}+x\right)$ (for this moment is right-turning). Second: the moment of the reaction at B equals $-\frac{p\,l}{2}\left(\frac{l}{2}+x\right)$, because it is left-turning.

This gives us the bending-moment

$$M'=p\left(\frac{l}{2}+x\right)\tfrac{1}{2}\left(\frac{l}{2}+x\right)-\frac{p\,l}{2}\left(\frac{l}{2}+x\right).$$

$$=\frac{p\,l^2}{8}+\frac{p\,l\,x}{2}+\frac{p\,x^2}{2}-\frac{p\,l^2}{4}-\frac{p\,l\,x}{2}$$

$$M'=\tfrac{1}{2}p\,x^2-\tfrac{1}{8}p\,l^2 \qquad (3)$$

20. Comparing (1) and (3) we find that

$$M=-M',$$

or, if the beam is to be in equilibrium, the sum of the moments on one side of any section is equal and opposite in sign to the sum on the other side.

The bending-moment is usually considered positive when it tends to bend the beam downward, and negative when the beam is convex above, which case rarely occurs in simple beams.

21. Equation (1), being of the second degree, is evidently the equation of some curve; we can, therefore, represent the bending-moment graphically. For this purpose let us write Equation (1) as follows:

$$M=\tfrac{1}{2}p\left(\frac{l^2}{4}-x^2\right)$$

Because the product of the sum and difference of two numbers is equal to the difference of their squares, this may be written:

$$M=\tfrac{1}{2}p\left(\frac{l}{2}+x\right)\left(\frac{l}{2}-x\right) \qquad (4)$$

Now $\frac{l}{2}+x$ and $\frac{l}{2}-x$ are evidently the two segments into which the beam is divided by the cross-section. If, for the sake of simplicity, we place $\frac{l}{2}+x=a$, and $\frac{l}{2}-x=b$, ($a+b=l$, the entire span) Equation (4) becomes

$$M=\tfrac{1}{2}p\,a\,b \qquad (5)$$

22. The reader sees that this is really only another form of Equation (1); in fact, it could have been derived in the same way. It expresses in terms of the segments of the beam what Equation (1) expressed in terms of x, the distance of the cross-section from the centre.

Equation (5) expresses the following law:

For a uniform load the bending-moment at any section through a beam is equal to the product of ¼ the load per foot multiplied by the segments into which the beam is divided by that section.

23. From Equation (5) it is apparent that we can represent the bending-moment (for any section dividing the beam into the segments a and b) by the ordinate $E\,H$ (Fig. 8) of a parabola $A\,H\,C\,B$, whose maximum ordinate $D\,C$ is $\frac{1}{8}p\,l^2$.

That is, if we make $D\,C=\frac{1}{8}p\,l^2$, connect A and C, draw $E\,H$ perpendicular to $A\,B$ at E, and intersecting $A\,C$ at F, then $F\,G$ parallel to $A\,B$ until it intersects a vertical through A at G, and lastly, connect G and C; this line will determine a point H of the parabola on the vertical through E, for

$E\,F : D\,C :: a : \frac{1}{2}\,l$

(Δ's $A\,E\,F$ and $A\,D\,C$ being similar)

$$\text{or } E\,F=\frac{\frac{1}{8}p\,l^2\,a}{\frac{1}{2}\,l}=\tfrac{1}{4}p\,l\,a$$

Also $F\,H : A\,G :: b-\frac{1}{2}\,l : \frac{1}{2}\,l$

(Δ's $C\,F\,H$ and $C\,A\,G$ being similar),

$$\text{or } F\,H=A\,G\,\frac{b-\frac{1}{2}\,l}{\frac{1}{2}\,l}=A\,G\,\frac{2\,b}{l}-1$$

And $A\,G=E\,F$; therefore, $F\,H=\left(\frac{2\,b}{l}-1\right)\frac{1}{4}p\,l\,a$

But $E\,H=E\,F+F\,H$

$$=\tfrac{1}{4}p\,l\,a\left(1+\frac{2\,b}{l}-1\right)$$

$$=\tfrac{1}{2}p\,a\,b.$$

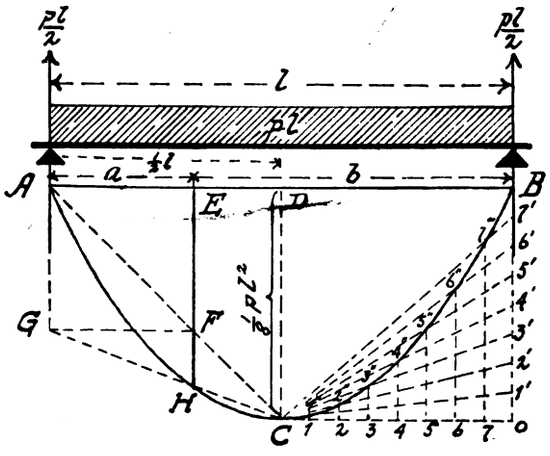


Fig. 8.

Consequently, the bending-moment at any point of the beam is equal to the ordinate of the parabola for that point.

24. This parabola may be most readily drawn by making $D\,C=\frac{1}{8}p\,l^2$ (Fig. 8), and then dividing $C\,O$ and $O\,B$ into the same number of equal parts; erecting verticals at the points 1, 2, 3, and drawing the lines $C\,1'$, $C\,2'$, $C\,3'$. The intersections $1''$, $2''$, $3''$ of

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the respective lines are points of the parabola. If a sufficient number of points is thus determined, the parabola may be drawn through them by means of a French curve.

25. By placing $P = p\,l$, Equation (2) becomes

$$M = \frac{P\,l}{8}. \qquad (6)$$

The reader will de well to memorize this equation, as it is the one most frequently made use of in practical work. It may be expressed as follows:

For a uniformly distributed load, the maximum bending-moment of a beam is equal to $\frac{1}{8}$ of the product of the entire load multiplied by the span.

The span l is to be taken in inches and the load P in pounds, so that M will be expressed in inch-pounds.

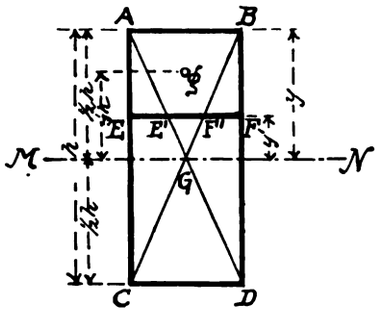


Fig. 9.

26. Having found in the bending-moment an expression for the amount of strain, we must now proceed to find a similar expression for the resisting stresses.

This expression is very appropriately called the *moment-of-resistance.*

27. It has been pointed out that the stresses are greatest at the extreme fibres of a cross-section, and diminish regularly as we near the neutral axis, at which they are equal to zero; or, the stress in any fibre varies directly with its distance from the neutral axis. Therefore, if $A\,B\,C\,D$ (Fig. 9) represents the cross-section of our beam, and $M\,N$, the neutral axis, passing through the centre-of-gravity G, parallel to the extreme fibres $A\,B$, $C\,D$, the stress in the fibre $A\,B$ would be to the stress in the fibre $E\,F$ as y (the distance of $A\,B$ from the neutral axis) is to y' (the distance of $E\,F$ from the neutral axis).

If we let the length $A\,B$ represent the amount of the stress in the fibre $A\,B$, then, by making use of a well-known property of similar triangles (that of their bases being to each other as their heights), we can represent the stress at $E\,F$ as that part of the line $E\,F$ included in the $\Delta\,A\,B\,G$, or $E'\,F'$.

For $A\,B : E'\,F' :: y : y'$

And stress $A\,B$: stress $E\,F :: y : y'$.

But stress $A\,B = A\,B$; therefore, stress $E\,F = E'\,F'$.

28. And the moment of the stress on any fibre of the part $A\,B\,M\,N$ (assuming this stress as a force acting vertically to the plane of the cross-section, for a reason to be subsequently given), as for instance, that of the fibre $E\,F$, about $M\,N$ will be equal to the product of, not $E\,F$, but its corresponding amount $E'\,F'$ in the Δ $A\,B\,G$, multiplied by its distance y' from the neutral axis, $M\,N$.

Therefore, to get the moment of the entire compressive stress about the neutral axis, we assume that entire stress to be concentrated at the centre-of-gravity of the Δ $A\,B\,G$, g, whose distance from $M\,N$, if the height of the whole cross-section equals h, will be equal to $\frac{2}{3}$ of $\frac{1}{2}\,h$ or $\frac{1}{3}\,h$ (the centre-of-gravity of a Δ being distant two-thirds of its height from the apex).

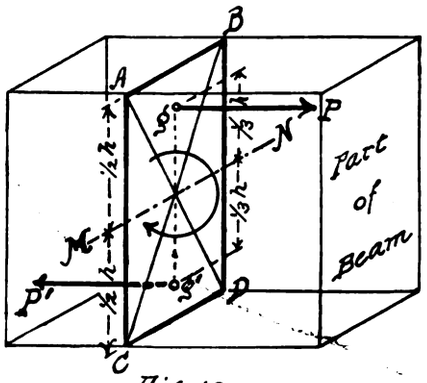


Fig. 10.

29. Inserting for P (the sum of all the compressive stresses), in Figure 10, which is an isometric view of the cross-section, its value $\frac{1}{2}\,(\frac{1}{2}\,h\,b)\,s$, which is the area of the Δ $A\,B\,G$ multiplied by the allowed stress of s pounds per square inch, we get for the moment of all the compressive stresses about $M\,N$ the following:

$$R_{comp.} = \tfrac{2}{3}\,h\,\tfrac{1}{2}\,(\tfrac{1}{2}\,h\,b)\,s = \tfrac{1}{12}\,h^2\,b\,s.$$

Similarly, we get for the moment of all the tensile stresses about $M\,N$,

$$R_{tens.} = \tfrac{2}{3}\,h\,\tfrac{1}{2}\,(\tfrac{1}{2}\,h\,b)\,s = \tfrac{1}{12}\,h^2\,b\,s.$$

As both of the moments turn in the same direction, as indicated by the arrow (Fig. 10), we add them together, and get for their sum

$$R_{comp.} + R_{tens.} = R' = \tfrac{1}{6}\,b\,h^2\,s \qquad (7)$$

The s, being a variable quantity, in every case dependent upon the strength of the material to be used, is usually eliminated from the equation, and the latter written,

$$R = \tfrac{1}{6}\,b\,h^2 \qquad (8)$$

30. This R is then called the moment-of resistance, although that term applies more properly to R' as given by Equation (7). It will, however, be best for us to follow the usual practice and call R the moment-of-resistance, understanding it to be defined by the equation,

$$R = \frac{R'}{s} \qquad (9)$$

31. From what has been said above, it follows that if the beam is not to fail, the following relation must hold good:

$$M = R', \text{ or}$$
$$M = s\,R, \text{ or}$$
$$\frac{M}{s} = R \qquad (10)$$

In which

M = maximum bending-moment in inch-pounds, as given by Equations (2) or (6).

S = allowed maximum stress on extreme fibres in pounds per square inch.

R = moment-of-resistance of cross-section in inches.

32. Equation (10) may be said to represent all the operations necessary to perform in determining the required cross-section of a beam for a given load and span. The bending-moment must be found; this, divided by the assumed safe fibre stress, gives the required moment-of-resistance, from which, if one of the dimensions of the cross-section be adopted — provided this be rectangular in shape — the other may readily be found.

Of course, for iron or steel beams, channels, etc., the R has been calculated for all possible shapes, and need simply be taken from the hand-books of the iron companies.

Of this we shall, however, speak more fully in the next chapter.

O. F. SEMSCH.

[To be continued.]

HISTORY OF THE UNITED STATES CAPITOL.[1]—IX.

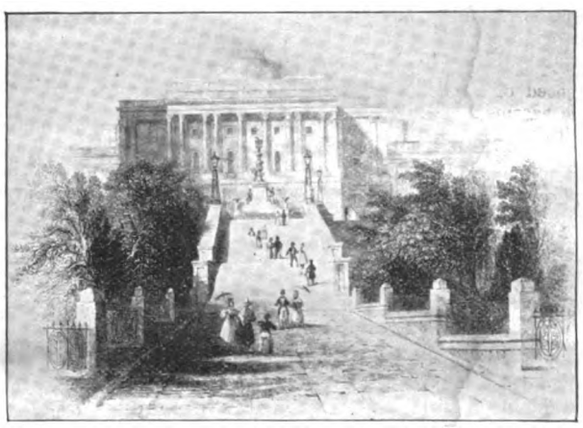


Fig. 58. View of Exterior Stairs and Western Portico. Bulfinch, Architect.

THE old Capitol was situated in a park of twenty-two and one-half acres (Fig. 60), enclosed by an iron railing. There were nine entrances to the grounds, two each from the north and south for carriages, two on the east and three on the west for

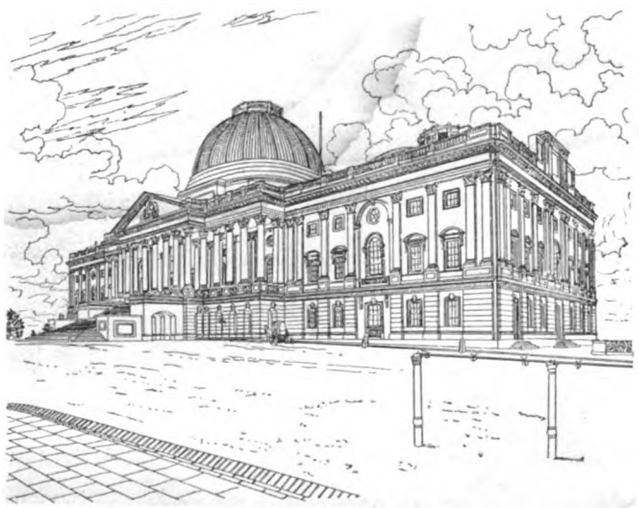


Fig. 59. From a Drawing made by George Strickland, Draughtsman for Bulfinch.

pedestrians. The western entrances at the foot of the hill were flanked by two ornamental gate or watch houses. The fence was of

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iron, taller than the head of an ordinary man, firmly set in an Aquia Creek sandstone coping, which covered a low wall.

On entering the grounds by the western gates, passing by a fountain, one ascended two flights of steps to the "Grand Terrace" (Fig. 58).

Upon the first terrace was the Naval Monument, erected to those who fell in the Battle of Tripoli. This was a white marble column, decorated with beaks of vessels and anchors grouped in various positions. On and around the column and base were allegorical figures. (See Fig. 63.) On the socle were the names of those who fell in the battle: Somers, Caldwell, Decatur, Wadsworth, Dorsey and Israel. This monument rose out of a basin of "water supplied from the contiguous fountain." This monument is now at Annapolis.

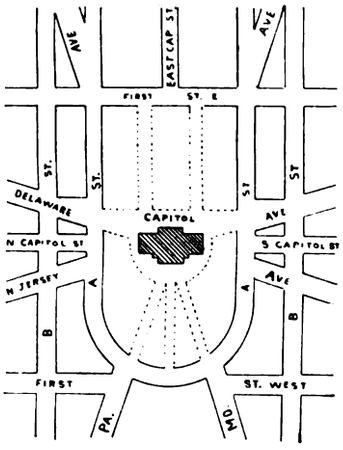


Fig. 60. Old Capitol Grounds, as completed in 1830.

There was an entrance into the sub-basement of the Capitol from the first terrace. Under the archway leading into this entrance was a marble fountain with water from Smith's spring.

The second flight of steps landed on the main terrace, a few feet below the level of the basement entrance.

The eastern entrance, according to Mills, had spacious gravel walks, through a "dense verdant enclosure of beautiful shrubs and trees circumscribed by an iron Palisade."

The old Capitol building covered 67,220 square feet of ground. The front was 351 feet, 4 inches long. The depth of the wings was 131 feet, 6 inches; the central eastern projection, including the steps, 86 feet (Fig. 59); the western projection, 83 feet (Fig. 58); the height of wings to the top of balustrade, 70 feet; to top of dome in centre, 145 feet. The portico on the east is 160 feet wide, composed of a double row of Corinthian columns, elevated on a rustic basement.

With the exception of the dome, the central portion of the present Capitol is the old building unchanged on the exterior. The basement of rusticated stonework is surmounted by the Corinthian order. Between the pilasters and columns two stories are grouped. The top of the building is surrounded by a stone balustrade. Over each wing is a low dome surmounted by a cupola. The central dome was considered high, because it reached a greater altitude than the domes shown on the plans of Thornton and Latrobe, Bulfinch having materially increased its height. The whole exterior walls and porticos were of Aquia Creek sandstone, painted white. The roof of the building, including the dome, was of wood covered with copper. The sub-basement, under the western portion of the central building, was utilized for committee-rooms. The north side was used by the Senate and the south side by the House (Fig. 62). On the east of the sub-basement were the store-rooms and "Refectory," or restaurant.

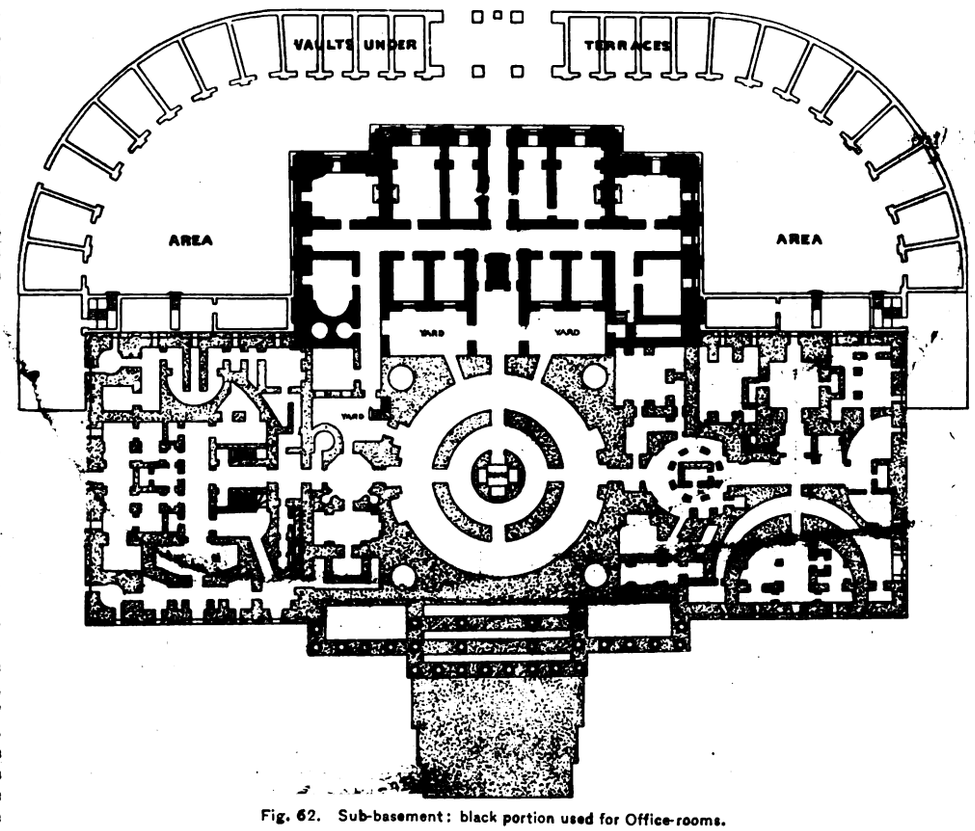


Fig. 62. Sub-basement: black portion used for Office-rooms.

From the western entrance of the sub-basement, a stairway leads to the basement story above. On both sides of this stairway a hall leads to the chamber prepared to receive the sarcophagus of George Washington, beneath the centre of the crypt. (See Fig. 62, plan of sub-basement.)

The basement story (Fig. 61) was a few feet above the street level on the east and the same distance above the principal terrace on the west.

This floor of the Capitol had several entrances on the south, north, east and west, where they would afford readiest access to the different portions of the building. An arcaded passageway ran under the principal eastern portion. At the north and south ends of this passageway were the vestibule entrances leading to the main stairways of the Senate and House. (Fig. 64.)

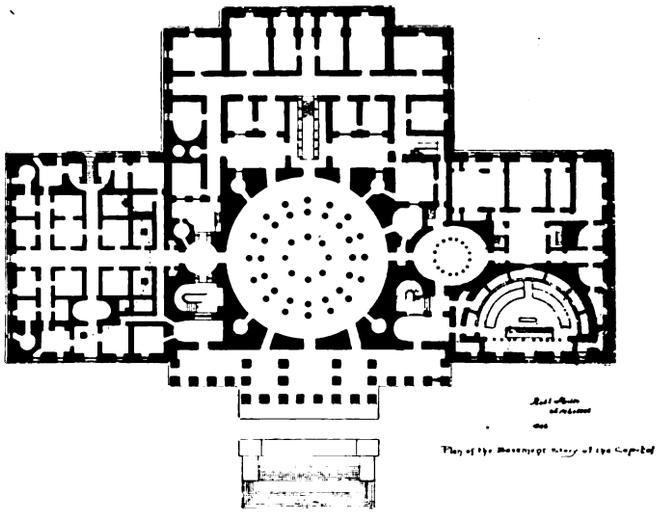


Fig. 61. Basement Plan from Drawing by Robert Mills.

The north half of the Capitol, except on the third floor and Supreme Court room, were appropriated to the use of the Senate and its committees, while the south part was appropriated to the House and its committees, clerks and other officials.

The central portion of the basement is the crypt, a circular room beneath the rotunda. The floor of the apartment above is supported on groined arches, resting upon Doric columns, modelled after those of the Temple of Pæstum (Fig. 66). Leading north from the crypt is a passageway to a central hall, lighted from above. This was originally intended for the stairway. The brickwork surrounding it has remained through all the changes.

Latrobe removed the stairway which led to the Senate above and placed it in the hall to the east, in a particularly out-of-the-way position, where only those familiar with the plan can find it. From this confined hall one doorway led into the Supreme Court, the other into the Marshall's Office.

On the west side of the elliptical passageway was a door leading to the Law Library. Farther north, on the west side, were the entrances to the apartments of the Clerk of the Supreme Court. Near the north entrance were the rooms of the Attorney-General and Judges, west and east of the hall, respectively.

The entrance to the court-room was from the Senate stairway hall. This room is semicircular in plan with an arched recess on the west, through which an arcaded passageway ran, and on which the

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groined-arch ceiling, which covered the whole room, rested. On the east of the room is a colonnade, through which the chamber is lighted (Fig. 65). At the present time the room is used as the Supreme-Court Library.

The columns were modelled on the Doric order. The construction is particularly massive, as the first domed ceiling of the room failed for want of proper abutments. Complaints were made of the lack of light and ventilation in this room. The floor, as late as 1847, was below the general level. In the tympanum of the west arch is a figure of "Justice" (Fig. 67).

On the south of the crypt a passageway leads directly to the southern entrance. The stairway to House of Representatives is just to the west of this hall; the space was occupied by committee-rooms. A furnace-room is below them for heating the house.

GLENN BROWN.

(To be continued.)

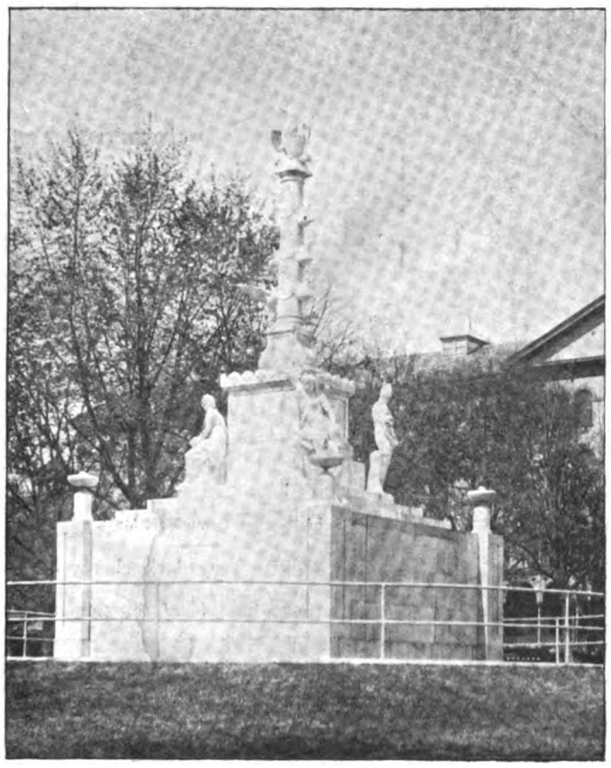


Fig. 63. The Tripoli Monument, Annapolis, Md.

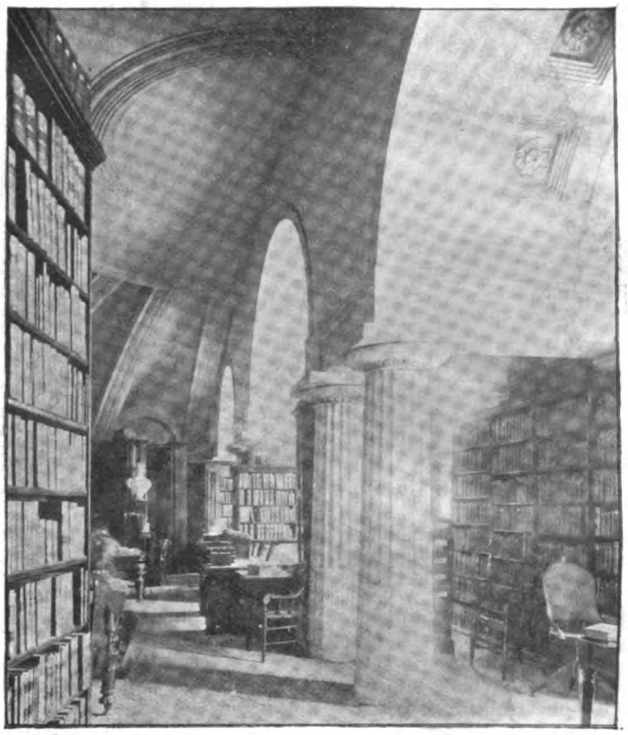


Fig. 65. Old Supreme-Court Room; Present Supreme-Court Library.

PATALIPUTRA, THE INDIAN TROY.

AT last the ruins of the Indian Troy, deeply buried in the débris of over twenty-two centuries, are likely soon to see the light. Pataliputra, the "Palibothra" of the Greeks, the "city of sweet-scented flowers," so famous in ancient Indian legend and romance, is perhaps most widely known as the capital of Asoka, the greatest of Indian emperors, and the most lavish devotee the world has ever seen. He covered his mighty kingdom from Afghanistan to the Deccan, from Nepal to Gujerat, with countless Buddhist monuments and buildings of vast size. His stupendous stupas, or mounds, of solid masonry, to enshrine Buddha's relics, or to mark some sacred spot, are found all over India, and are almost like Egyptian pyramids in size. His colossal "edict pillars," single shafts of stone over forty feet in length and beautifully polished and sculptured, still excite the admiration and wonder of all who see them. How magnificent, then, must have been the capital of this great Hindoo king, who was the ally of the Greek kings, Antiochus of Syria, Ptolemy of Egypt, Antigonos of Macedon, Magnas of Cyrene and Alexander of Epirus.

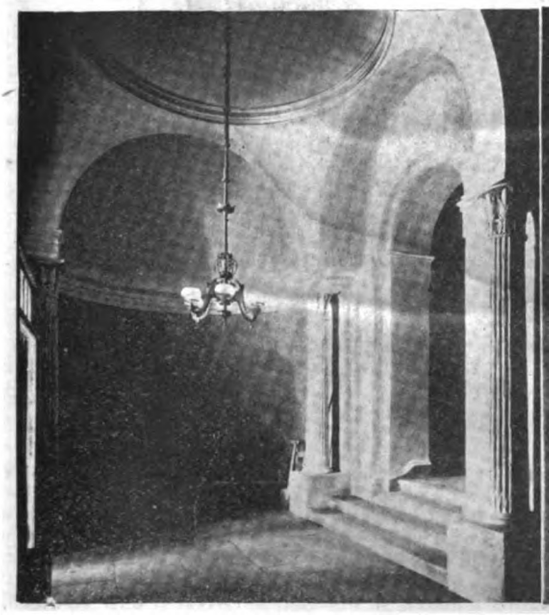


Fig. 64. Vestibule of Senate Basement.

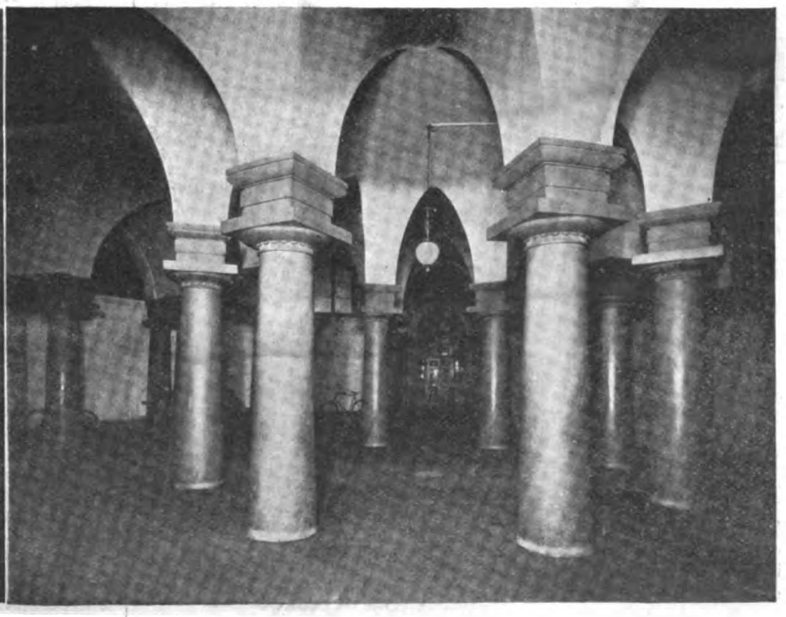


Fig. 66. Crypt.

ALUMINIUM GLASS. — A French glass expert, named Appert, has made experiments showing that glass modified by the introduction of 7 or 8 per cent of aluminium is more solid, less changeable, and more elastic than ordinary glass. — *N. Y. Evening Post.*

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It was already a splendid city in the fourth century B. C., in the time of his grandfather, Chandragupta, the Greek Sandracottus, as we learn from the glowing descriptions of Megasthenes, the ambassador of the successor of Alexander the Great. At that time the buildings were all of wood, like the palaces and temples of Burmah in the present day. It is a matter of history, however, how Asoka found this capital of wood and left it of stone. But, before the dawn of our era, this great city had decayed with the fall of Asoka's dynasty and the smaller succeeding dynasties, and the transfer of capital elsewhere. In 400 A. D., the Chinese pilgrim Fa Hian reported that it lay deserted and in ruins. Since the Mohammedan invasion in the twelfth century A. D., the very site of this city was forgotten. It was known to be somewhere near the modern town of Patna, in



Fig. 67. "Justice," in Old Supreme Court.

Bengal; but most of the experts and others who had deliberately searched for it believed that it had been entirely washed away by the Ganges. Then it will be remembered that Surgeon Major Waddell, in 1892, during a flying visit to Patna, found that the leading landmarks of Asoka's capital still existed. He found several sculptured stones and images of the Asoka epoch lying on the surface or built into houses or walls, and these, together with the position of the old mounds, many of which still retain their ancient names, enabled him to fix with certainty the limits of Asoka's citadel, and also to indicate roughly the possible sites of particular buildings for exploratory excavations, without which, of course, no detailed identifications could be decisively attempted.

Unfortunately, most of the likely mounds now contain Mohammedan graves, for the Mohammedan invaders were wont to seize the highest mounds for their residence and burial grounds, and for centuries they have used these ruins as a quarry for their building material. Still, a beginning has now been made, and already at Patna, where five years ago no stones of the Asoka period were suspected to be, there may now be seen pieces of the well-known stone posts, the so-called Asoka railings, with their quaintly figured medallion-like bosses, by which Asoka perpetuated in stone the original wooden fences which surrounded the sacred Buddhist spots. And close by, one may see, about twelve feet below the present surface, parts of "the wooden walls" of Palibothra, with their marvellously well-preserved Sal timber, over twenty centuries old. — *Calcutta Englishman.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF BYRON NUGENT, ESQ., ST. LOUIS, MO. MR. W. A. SWASEY, ARCHITECT, ST. LOUIS, MO.

[Gelatine Print, issued with the International and Imperial Editions only.]

HOUSE OF G. W. POMROY, ESQ., HARTFORD, CONN. MR. F. R. COMSTOCK, ARCHITECT, HARTFORD, CONN.

THE exterior is clapboarded and painted an old red with ivory-white trimmings and moss-green roof. The underpinning is of Longmeadow stone, the chimneys being of buff brick, the one on the exterior having a foundation of cut-stone with a terra-cotta tablet at the second story. The dimensions of the house are 33′ x 63′. At the main entrance is a vestibule with a dome over it, the ceiling of which is handsomely decorated. The central dome is 6′ in diameter. Back of the main cornice and dome are incandescent electric-lights, 18″ apart.

THE ZEBU HOUSE: NATIONAL ZOÖLOGICAL PARK, WASHINGTON, D. C. MR. GLENN BROWN, ARCHITECT, WASHINGTON, D. C.

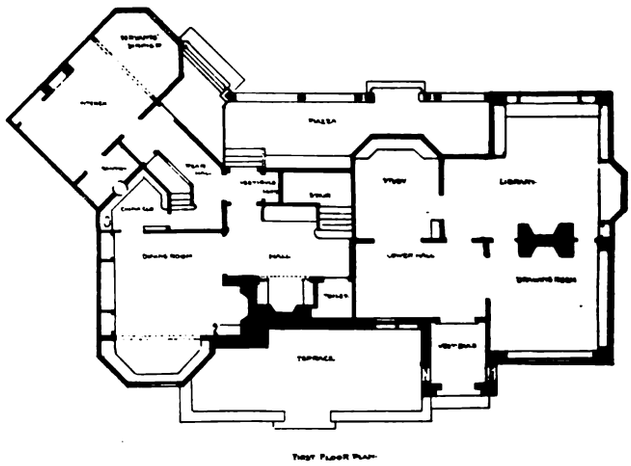
HOUSE FOR REV. F. E. SMILEY, DENVER, COL. MR. WM. COWE, ARCHITECT, DENVER, COL.

ALTERATIONS IN HOUSE OF MRS. M. B. HEWITT, CAMBRIDGE, N. Y. MR. F. R. COMSTOCK, ARCHITECT, HARTFORD, N. Y.

HOUSE OF C. S. ROBERTS, ESQ., BRATTLE STREET, CAMBRIDGE, MASS. MR. W. G. RANTOUL, ARCHITECT, BOSTON, MASS.

THE house is carried out inside somewhat in the style of the old English half-timber houses.

The hall and dining-room are wainscoted high, with quartered-oak and have deep recessed fireplaces with settles.



Plan of House for C. S. Roberts, Esq., Cambridge, Mass.

The library is wainscoted high with very dark cherry and has long bookcases.

The drawing-room is executed more in style of the time of King George III, in white-ivory finish.

WAREHOUSE OF THE J. F. DIETZ CO., CINCINNATI, O. MR. HARRY HOKE, ARCHITECT, CINCINNATI, O.

[The following named illustrations may be found by reference to our advertising pages.]

MAIN ENTRANCE, SOUTH FRONT: LAW COURTS, COLOGNE, PRUSSIA.

SIDE ENTRANCE OF THE SAME.

WAITING-ROOM, SOUTH WING OF THE SAME.

PALAZZO FARNESE, CAPRAROLA, ITALY: PAINTINGS IN THE UPPER PART OF THE GRAND STAIRCASE, EXECUTED BY TEMPESTI.

A GROUP OF COUNTRY CHAPELS.

[Additional Illustrations in the International Edition.]

CHÂTEAU DE LA MOTTE-BELAIR, LOIRET, FRANCE. M. LOUIS PARENT, ARCHITECT: THREE PLATES.

[Copper-plate Photogravure.]

HALL IN THE NEW LAW COURTS, BUDA-PESTH, HUNGARY. PROF. A. HAUSSMANN, ARCHITECT.

THIS plate is copied from *Zeitschrift für Bauwesen.*

MONUMENT COMMEMORATING THE REUNION OF THE COUNTY OF NICE WITH FRANCE. M. JULES FEBVRE, ARCHITECT.

THIS plate is copied from *L'Architecture.*

SECOND PRIZE DESIGN FOR RECONSTRUCTION OF BUILDINGS ON NORTH BRIDGE STREET, EDINBURGH, SCOTLAND. MESSRS. GIBSON & RUSSELL, ARCHITECTS.

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MONUMENTS TO L'HOSTE, M. DELMER, ARCHITECT, AND TO GRAD, M. UMBDENSTOCK, ARCHITECT.

THESE illustrations are copied from *La Construction Moderne.*

SOUTH FRONT: COATS' MEMORIAL CHURCH, PAISLEY, SCOTLAND. M. HIPPOLYTE BLANC, ARCHITECT.

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DECEMBER 12, 1896.

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ONE of the gravest defects in our political system is the violent and ultra-radical way in which we attempt to improve on methods and processes which have proved only measurably deficient. The populace will have no more of it, or them, as soon as a chance arises for making a change. Away with it! Off with his head! is the demand of a political party as soon as a victory at the polls enables it to get at its predecessors in power and their works. Actual efficiency and faithful endeavor have no standing at the bar of political opportunism, so each political overturn sees the dismissal for party reasons of public servants who have fairly discharged their duties, and have acquired a knowledge of their work and familiarity with its details, which no prudent man of business would reward by turning its possessor adrift at the very moment he could be of most value to the work in hand. Of the several public servants in whom our profession has an interest, it has a more intimate concern with the Supervising Architect of the Treasury Department than with any other. His fate just now, *more politico*, hangs in the balance, and the President-elect has, since his election, been visited by applicants for the office which they hope will be vacated next March. In certain, perhaps in many, cases it would be nothing less than a moral scandal to appoint to so important a post one of these self-seeking gentlemen. Unfortunately President Cleveland has not been able to bring within the scope of the Civil Service Rules the position of Supervising Architect, though the latest extension in Civil Service Reform has thrown its protection around the greater part of the employés in that bureau. Mr. Aiken, the present incumbent of the office, has, during his short term, developed qualities and capacities which deserve the recognition and demand the support of his fellow-members in the profession. It must be known to the President-elect that the office of the Supervising Architect is distinctly in a transitional state and that it will by force of public opinion be kept in a transitional state until it can be permanently modified, reformed and improved in consonance with the demands of an awakened and educated public demand. It would, therefore, seem to be the part of good public policy to retain at the head of the department a man who thoroughly realizes that the office is in a transitional state, and is, from the inside, honestly working out the solution of a very difficult problem by doing what he can under existing restrictions to bring the methods and workings of his department into keeping with the recommendations which the profession and public are urging from the outside. Mr. Aiken, far more than any of his recent predecessors, has been willing to sacrifice his personal ambitions and a desire to make a name, and has devoted himself to the execution of his many-sided duties in the spirit of a good executive official. He has been willing to introduce into the office several men who very likely are much better designers than he is himself, and has not, like his predecessors, given chief attention to "impressing his own individuality" on every design prepared in the office. The result is that the designs, which will be shown in his forthcoming annual report, will be found to be markedly superior to recent governmental buildings in all that concerns propriety, sobriety and common-sense. It is our belief that the President-elect could do no more judicious thing than to reappoint Mr. Aiken, on the distinct understanding that he should, during his second term, carry forward with more activity than ever the very beneficial and generally satisfactory transitional movement he has already inaugurated.

THE Manufacturers' Accident Association of France has issued a card, to be posted in all factories where electric currents or electric apparatus are employed, giving warnings and suggestions in regard to the safe and proper use of such things. In general, it is prescribed that no work not connected with the electric machinery shall be carried on in its neighborhood; that no iron tools or other objects shall be brought near them, and that workmen shall not stand in the neighborhood of the machines except in performance of their duty. For those who are obliged to be about them, it is recommended that rubber carpets or mats should be spread, entirely covering the floor near the machines. If these cannot be afforded, insulating platforms of boards, standing on glass feet, or even on brick, should be put about the machines. India-rubber gloves, though useful, have their protecting power destroyed by a hole, even so small as to be imperceptible, and they do not last long. Persons handling wires should use one hand only, keeping the other free, and as far as possible from any wire, machine, pipe, or piece of metal of any kind. In case fire should appear around any wire, switchboard, or other electrical apparatus, it is absolutely forbidden to throw water or wet cloths on it, or to allow anything of the kind to come in contact with any wires or electrical apparatus whatever, until the current has been shut off from the locality by cutting the wires or otherwise. High tension wires are not to be touched on any pretext, however thick the insulation; and no person is to be allowed to enter, without special authority, the place where transformers are installed, or to carry a light, or smoke, in a room containing accumulators. In regard to the latter, it is explained that the action of accumulators is accompanied by the evolution of hydrogen gas, so that explosions may easily occur, unless the place is well ventilated, and fire kept out of it.

SEVERAL of the foreign technical journals give illustrations of the roof-trusses of the Machinery Hall at the Geneva Exposition, which deserve the most careful attention of architects and engineers, since in them as in the similar trusses of the Mines and Mining Building at Chicago the cantilever principle, so successfully used for bridges of wide span, has first been applied to roofs, although it was evident, when the first cantilever bridge was built, that it would not be long before the same system would be used in roof-trusses, for which it is still better adapted than for bridges. Every one knows that the cantilever bridge consists essentially in a girder of the most economical shape, which, for iron work, is that with the upper chord horizontal, and the lower forming an obtuse angle, balanced on the apex of the lower chord, which is supported by a pier. The arms of the girder extend each way from the pier, one forming the shore end of the bridge, while the other extends over the waterway, toward the corresponding arm of a similar cantilever on the other shore, an ordinary girder being usually hung between the two cantilever arms which project over the waterway, to make up the total span. This construction gives necessarily a bridge in three spans, a shore arm to the cantilever being needed to balance the arm extending over the waterway; so that it would not be applicable to a roof of a single span; but for a building with nave and aisles, separated by piers or columns, it enables the designer to use a roof, consisting of inclined cantilevers, balanced on the columns or piers, with what

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may be called the shore ends resting lightly on the outside walls, while the other ends meet at the ridge of the roof, pressing together, if the cantilevers are accurately balanced, with the merest touch. As the horizontal thrust of a roof is, roughly speaking, equal to the force with which the two sides push against each other at the ridge, it is evident that a roof of this sort, if properly designed, needs no tie-rods, either above or below ground, as it exerts no thrust whatever; while its form gives a perfectly unobstructed space under the ridge, where the ordinary trusses are most encumbered with members. The aisles, moreover, are not obstructed by the springings of the arched ribs once in common use for roofs of wide span, and yet, the weight on the outside walls, which may, if necessary, be reduced to nothing, is, in any case, so small as to give the utmost freedom in placing windows. Such is the roof of the Geneva building, and it seems to us that this will, for a long time to come, be the accepted type for wide roofs. Judging from what has been accomplished with cantilever bridges, it would be easy to design and construct a roof of this type over a building a thousand feet wide or more, where the space could be divided by piers into three spans. The middle span would naturally be twice as wide as the side spans, but the construction allows much latitude in this respect.

A GREAT commotion has been raised in London by the disclosure of the way in which public works have been carried out under the present method of administration. Some time ago, with the view of conciliating "Labor," the London County Council fell into the plan of being its own contractor, and thus, by dealing with "Labor" directly, of depriving the "capitalists" and their "hirelings," who have hitherto done the city's work so efficiently and economically, of the opportunity to become further "bloated" at the expense of the "toiling millions" to whom they paid wages. With this idea, they appointed a Works Committee, of which Mr. John Burns, M. P., apparently from a vague notion that a labor champion would know something about labor, seems to have been a member. This Committee had under it a Works Department, and in the care of the Works Department were put the building and other operations of the municipality. Some of the proceedings of this Department have now been made public, and we commend the story to the students of municipal government. As one instance, it appears that, some months ago, additions were to be made to an insane asylum at Colney Hatch. When the plans were ready, advertisements were published, inviting tenders from contractors. The lowest bidder was a certain firm, which offered to do the work for £18,812. On the publication of the bids, the representative of this firm inquired at the proper office, and was told that none of the bids would be accepted, as the Works Committee found that they could do it themselves for a smaller sum, which they estimated at £17,500. By what process of estimating they arrived at this result does not appear, but the evidence certainly indicates that the Committee never took the trouble to make any estimate at all, but deluded the bidders into measuring the quantities and getting prices, and then got rid of them by impudently professing to have made an "estimate" lower than the lowest honest one received.

AS might have been predicted, the skill and prudence with which this alleged "estimate" was prepared, and the work carried out under it, turned out to be quite of a piece with the sense of honor and integrity displayed in the beginning of the transaction. Very recently, suspicion having been excited as to the way in which the new Department was carrying on its philanthropic work of wresting from Capital its ill-gotten gains, an expert was deputed to examine its books, and, among other things, it was discovered, as appears from the newspapers, that the work at the Colney Hatch Asylum had already cost six thousand pounds more than the estimate. A still more interesting discovery was made, however, in the fact that the Department, fearing apparently that sordid considerations on the part of the tax-payers or the County Council might give occasion for embarrassment to its great career against the consuming classes, had systematically falsified its books, charging work really done on buildings, the cost of which had greatly exceeded the estimates, to others, which were either unfinished, or had made a better financial showing. In regard to the Colney Hatch Asylum, it was found that material was sent from the docks to the asylum without any charge; that nearly ten thousand dollars' worth of material was credited as having been transferred from Colney Hatch to another asylum, and to certain sewer works, which had never been transferred at all; and that other material, which was really transferred, was credited at a fictitious valuation, nearly fourteen hundred dollars in excess of its real value. In regard to the transfer which was totally false, circumstance had been given to the lie by the filing of certificates of the transfer of the material, signed by two of the foremen on the work. These certificates were obtained, as the evidence showed, by the chief clerk of the Department, who pleaded in his defence the orders of the manager. The manager somewhat furiously repelled the intimations of the chief clerk, but a document in the manager's handwriting was produced by the book-keeper, giving a list of suggestions for arbitrary alterations of cost, which proved to have been approximately followed, so that his disclaimer does not seem to have produced much impression on the investigating committee. What will be the end of the affair remains to be seen. It is fair to say that the investigating committee did not find any reason to suppose that either the manager or his subordinates took advantage of the falsification of the books to put any money directly into their own pockets, and the affair seems to have been a manifestation of the weak moral sense generally characteristic of those concerned in carrying out socialistic experiments, acting in connection with the desire to retain their positions by making a good financial showing, and also, probably, with political designs.

A PERIODICAL with which some of our readers should make acquaintance, unless they already know it, is known as *Home Study*, and is published by the Colliery Engineer Company, Scranton, Pa., at one dollar and a half a year. It is a well-written and well-illustrated little journal, devoted to giving instruction in various matters of engineering, electrical, mechanical and architectural, and in architectural drawing. To the experienced reader of cheap journals, alleged to be devoted to popular architecture, and science for the million, this description will call up only visions of monthly publications, made up, with the help of scissors, mainly out of old receipt-books, with the addition of original articles, characterized by frightful ignorance of the first rudiments of scientific knowledge, and adorned with "models" for architectural drawing, consisting of rudely-drawn designs for jig-sawed ornaments, adapted for use either on "village churches in the Queen Anne style," or on æsthetic chicken houses, according to circumstances; and we hasten to say that *Home Study* bears no resemblance to these productions. Amongst recent illustrations, it gave a plate which is substantially Vignola's Doric order, including the diagram for working out the entasis, all beautifully drawn on a sheet about three times as large as one of the Vignola pages, and accompanied by an excellent text, with an invitation to readers to draw the plate in the proper proportions, and send it to the editors for correction; while the other articles, on plumbing, engineering, etc., are explained by beautiful cuts, clear, modern and numerous. The science shown in the various departments is unexceptionable, and most of it is so far new as to give evidence that it has not been copied from a book. Even architects can learn something from the very practical paper about the use of mortar and cement in freezing weather, and we should say that a good many steam-engineers would find the papers on the theory of heating, expansion and evaporation useful, as well as interesting. It is, perhaps, unfortunate that the proprietors should have chosen the name of *Home Study* for their magazine. The world is so accustomed to see the name of "Home" perverted to advertise so many abominations that it creates a certain prejudice at the outset. Every one knows that, in auction advertisements, "a beautiful country home" means a tottering barrack in a malarious swamp, while the "Home Chicken Feeder," the "Home Hair-Brush," or the "Home Stable Lantern," are generally the worst of their kind; and, in literature, Shakespeare's opinion, that "Home-keeping youth have ever homely wits," seems to be fully shared by publishers, who adapt their "Home" periodicals to the presumed intelligence of their customers. In *Home Study*, however, there is no appeal to homely wits; on the contrary, unless the students of plumbing and steam-heating are of a superior class, some of the writing in it is likely to be a little above their heads; but this is a fault, or, rather, a virtue, which will highly commend it to people of real intelligence and ambition.

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THE CHATEAU DE BLOIS.[1] — III.

THE WING OF FRANCOIS I. — III.

IN the old engraving by Du Cerceau of the court-yard elevation of this north wing the staircase is shown in the centre of the façade, with its entrance, as at present, at the level of the court-yard. On both sides of the staircase are carefully drawn galleries or arcades, work of Henri II, the one on the left affording communication with a terrace occupying the western half of the court-yard, the *Perche aux Bretons*, and the staircase. That on the right, if it ever existed, could have been used only as a balcony or terrace, and entered from the *Salle des Etats*, it being useless as a means of communication, owing to its abutting against the staircase midway between two runs. Of the existence of this arcade there is doubt, as only the drawings above mentioned can be cited in proof, and a few holes in the architrave course above the basement window lend but little additional evidence. Of the west gallery alone — the one shown on the left — three or four arches remained until a few years ago.

The unreliability of Du Cerceau may be illustrated in this instance, finding he has for symmetry's sake supplied the right-hand arcade. Or, being of his own epoch, he could possibly have been their author and the work never completed. However, the existing one was so inharmonious with the earlier work, though of value in emphasizing the meagre base, that the restorer considered it advisable to remove all traces of this later Renaissance work.

Complex as the composition of the staircase appears with its great piers, many arches and rich balconies, it is simple in conception, the plan being that of an octagon with three sides imbedded in the body of the building. The external angles are marked by four great piers placed radially, while a central newel supports the inner ends of the risers, the outer ends resting on the wall or being carried by the arches between the piers. The soffit of this run is concealed by a barrel-vault, which springs from a moulded cornice on the outer shell to a corresponding one winding around the central newel. Whether this simply conceals the soffit of the run, or is the true supporting member, can hardly be definitely determined, there being no way of readily examining it throughout, while the drawings of the old work can be interpreted in either way.

Where the run passes the openings between the piers, the vault and risers are carried by an inclined arch of peculiar character, the



Newel of the Staircase of Francois I, Chateau de Blois.

[1] Continued from No. 1079, page 68.

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central and longest part of which is straight or inclined, according to the position of the burden it supports, always being parallel thereto, while the haunches turn abruptly in a quarter circle to the impost cap. The vault is divided longitudinally by two ribs and is crossed by radial ones, which spring from the newel to the internal angles of the piers and wall, and are received on the drum of the newel by small colonettes and in the angles by half columns. The intersection of these ribs is marked by discs bearing a variety of ornaments, emblems of François I and of his wife, Claude.

The vault sweeps down to the ground at the base of the newel and at the top of the run abuts an arch of the same section, the risers there leading to a platform, which is guarded by a solid rail.

The columns in the angles do not directly support the cornice at the spring of the vault, but receive an arch of similar character to those described, the quarter circle of which springs from the necking of the capital, the straight portion being parallel to the cornice it supports. The abacus of the capital is at right angles to the axis of the column, and not inclined as are those of the small colonettes on the newel. This arch acts as a pendentive in the transition from the octagon to the circular plan of the vault itself.

The newel has a hand-rail carved from the solid, which extends from the base-mouldings at the foot to the solid rail of the highest landing, at which level it encircles the newel in a horizontal band. The colonettes, receiving the radial vaulting ribs, divide the newel into a series of panels, each crowned by a shell and richly ornamented. The bases of these small columns are horizontal, while the capitals are inclined parallel to the lines of the vault, and between the plinths the base-moulding of the newel appears. The colonettes above the last landing rest on the horizontal band formed by the moulding of the hand-rail and support the capital or crown of the newel, from which to the wall springs a circular vault of the same character as the inclined soffit of the stairs and ornamented in the same manner. On each landing open two doors of the same height, crowned by circular pediments, the intersection of which with their cornices and with the angle columns gives rise to a problem that would resist solution at the hands of all save Gothic workmen. The top landing opens on the *chemin de ronde*, which extends around the staircase, making a continuous promenade along the entire façade. The roof of the staircase is supported by the circular vault mentioned, and is a flat deck, access to which is gained by means of a dormer in the roof of this wing.

The exterior is marked by strong piers extending from the ground to the cornice with a strong moulded base. They are interrupted at half their height by a strong band of mouldings that, so far as appears, bears no relation to the façade or to any structural feature of the staircase. These piers are crowned by a small capital and a cushion. An architrave band intervenes between the capital and the soffit of the corona of the cornice, the modillions and dentil band, and lower members of the cornice being cut in between the piers. The dentil course is only blocked out, no dentils having been cut.

Between the piers there is a crude attempt to imitate a Classic arcade: not having width enough, the designer was compelled to combine impost and pilaster, thus giving rise to this characteristic feature. The arris or edge of the impost and archivolt has a quarter-round moulding, doubtless intended to be ornamented by a guilloche, since in several places it has been advanced to various stages of completion.

The three piers towards the entrance of the court-yard are richly decorated at their base by arabesques and, above, carry rich corbels supporting statues with elaborate and delicate canopies.

The balconies which add such richness to this picturesque composition, are inclined at a slighter angle than arches supporting the run of the staircase, giving rise to an awkward-shaped panel. The railing of these balconies above the first run is divided by small piers into panels, which are decorated by the emblems of François I carved in high relief and penetrated. The soffit of the balcony is decorated and at its lowest point adjoining the pier is a gargoyle. The present ornaments of the railings of these balconies are creations of the restorer, and one is inclined to doubt the existence of them at the time of erection of the staircase; its being an afterthought is not improbable, passing as it did through the hands of so many workmen. The panels on the two sides not now filled by balconies have a simple salamander in high relief.

The entrance-door is low and insignificant, but it is richly ornamented, the details being similar in character to the richer portion of the façade. The interior details are crude and of much earlier date, bearing every mark of the same hand that surrounded the tower on the north with its galleries.

Above the cornice the piers are reduced to simple pilasters, affording space for the *chemin de ronde*, which, as already mentioned, extends around the staircase with its rich balustrade of the same design as the façade. The upper story, or attic, is crowned by a cornice and balustrade, the angles of which are ornamented by a salamander between pilasters.

To those interested in the architecture of this period nothing is more instructive than a comparison of the different staircases of this epoch. If one compares those of the period of Louis XII at Blois with this *chef d'œuvre*, it will be clearly seen that in every constructional point the designer of the Renaissance copied the work of his Gothic predecessor, clothing his frame with a veil of Renaissance detail that reveals rather than conceals the Gothic spirit.

W. T. Partridge.

ELECTRIC WIRING.[1]

It is only a comparatively short time since the introduction of electricity for light, heat and power, and as a result of the introduction of this force, it has been necessary to meet conditions that previously did not exist.

When electric lighting was first attempted, the wire used was not properly insulated, the appliances, such as switches, sockets, cut-outs, etc., were not only crude, but were absolutely dangerous to life and property.

Until within a few years, it was not considered necessary for an architect to make any special provision in his plans of a building for the electrical installation in the same. Formerly and, I am sorry to say, in some cases quite recently, while provision was made in the plans of buildings for water, gas and other pipes, proper provision was not made for the wiring, and when the time came to install the electrical wiring, etc., the electrical contractor was called in and, if I may be allowed to use a slangy expression, was practically told to "get there" the best way he could. Even then, if he was fortunate enough to find locations for his wires that were fairly satisfactory, there was no surety that the plumber or the gas or steam fitter might not come along and run pipes in the location selected for the wires, or in such close proximity to them that the pipes would be in contact with them, in which cases the wiremen would have to change the location of their wires, or else allow them to remain under conditions that might at any time be the cause of a fire; the rights and necessities of the wiremen being considered secondary to those of the mechanics previously mentioned.

Many of the fires in the past few years have been directly traceable to defective wiring, or defective electrical appliances installed in buildings, and it was with this fact in mind, as well as the supervision of overhead wires, etc., that the Legislature of 1890 took action to place "every wire over streets or buildings, in a city, and all wires within a building when such wire is designed to carry an electric light or power current," under municipal supervision.

Electricity has become such a factor, that a building erected at the present time would be considered incomplete if provision had not been made for the use of electricity in the same; this holds true from the modest little home, with its wiring run on porcelain insulators or through porcelain-bushed timbers, to the mammoth hotel or office-building in the heart of the city, wired in the so-called conduit or drawing-in system.

As regards the duties of the Wire Department in reference to the interior wiring of buildings, I would say that to it is delegated by law the supervision of all wires designed to carry a current of electricity for light or power, and of all supports, attachments and appliances used in connection with the same.

The Wire Department is absolutely impartial in all its decisions, it having the welfare of the owners and architects of the buildings, and of the electrical contractors and the public-at-large, mutually at heart.

There is no body of men in this city who can be of greater assistance to the Wire Department in its attempt to improve the standard of interior wiring, than the architects from whose fertile brains are evolved the plans of the massive and beautiful buildings that are constantly being erected around and about us, and in the electrical fitting of which thousands of appliances and hundreds of miles of wire are used.

As we all know, the present method of wiring the modern office or hotel building is the conduit system.

In the plans of a building of this class, I would call your attention to the advisability of providing proper shafts or wire-ways for the main or feed wires, so that they may be run on porcelain or glass insulators, a type of work which is undoubtedly superior to any other method at present in use.

The location of switches, safety cut-outs, etc., should also receive careful attention; this is especially the case as regards the location of cut-outs. We would not for a moment think of putting the safety-valve of a boiler in such a position that it would be practically inaccessible for the purposes of inspection, etc., but this is precisely what is done in many cases with the cut-outs and safety-fuses of an electric circuit. The natural results of having safety-fuses located in out-of-the-way and inaccessible places is that after they have operated once or twice, the attendant, janitor or other interested person, through ignorance or otherwise, puts a very heavy fuse or possibly copper wire in the cut-out, thereby doing away with its functions and inviting a fire.

It would surprise you, gentlemen, if you should see the amount of copper wire and excessively large fuses that are removed from cut-outs by the inspectors of the Wire Department in the course of a year, and in the majority of the cases the cut-outs improperly fused are in out-of-the-way places.

Another subject that I desire to say a few words about is the electric motor. At the present time there are about five thousand motors with a total capacity of over fifty thousand horse-power in use in Boston. When properly handled, there is no piece of machinery that gives less trouble than the electric motor. On account of its simplicity of handling and its universal usefulness, it is placed in many cases in charge of persons that do not understand the necessity of giving the motor proper attention, and who would not

[1] A paper read before the Boston Society of Architects, December 4, 1896, by Mr. Thomas W. Flood, Commissioner of Wires for the City of Boston.

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be considered competent to handle a piece of machinery dependent on steam for power.

Among the requisites for the satisfactory operation of motors is absolute cleanliness.

If a motor is located in an out-of-the-way place, the motor is not apt to receive proper attention, is liable to get oily and dirty, and the brushes are liable to wear and get to sparking, for want of proper attention. This is especially liable to be the case if the switch and starting rheostat are located away from the motor, as is considered desirable in many cases where the motor is used for operating a ventilating-fan or an elevator. It has been the policy of the Wire Department in the past to insist, except in a few exceptional cases, that the starting rheostat and switch be located in close proximity to the motor, so that in case of trouble at the motor when it is started, the person operating the rheostat and switch will observe the same. I would suggest that in all cases where it may be necessary for you to plan for the installing of a motor, that a location be provided for it as accessible as possible, and if it be necessary that the motor be located in one place and the starting rheostat and switch be located away from it, for instance on a different floor, that a fireproof room or location be provided for the motor.

The question of fittings is an important one and one that demands considerable attention.

Competition between manufacturers and dealers of fittings for use in electrical construction have been so sharp that the tendency has been to cheapen them at the expense of safety and durability.

We are at the present time making exhaustive tests of switches and cut-outs, the results of which we expect to be productive of much good. We find that many that are at present on the market are totally unfit for the uses for which they are on sale.

I would suggest that in future, in all specifications for electrical installations in buildings within the city limits, a clause be inserted that all work and material used in the same will be subject to the approval of the Wire Department of the City of Boston.

Different Classes of Work. — Conduit system, consisting of non-combustible pipe or tube which is continuous from one outlet to another, and which serves as a race-way for the wires which are not supposed to be drawn into the conduit until after all mechanical work in the building has been as far as practicable completed.

To conform with Wire Department rules, conduit tubes must have sufficient mechanical strength to afford protection from saws, chisels, nails, etc.

Open-work. — This class of work is exposed to view except where wires pass through floors and walls, at which places the wires must be protected by an approved tubing, such as glass or porcelain. In all other places, to be approved, the wires must run on porcelain or other approved insulators or cleats, which keep wires of opposite polarity, with a difference of potential of 150 volts or less, at least 2½ inches apart; for higher voltages, distance between wires must be proportionally increased.

In breweries, packing-houses, stables and other buildings especially liable to moisture, and also where wires are run directly under a roof, wires for 150 volts or less must be kept at least 6 inches apart and be supported on porcelain or glass insulators; for higher voltages, distance between wires must be increased.

Moulding Work. — This class of work is not allowed in locations damp or liable to be so, or in locations concealed from view. Mouldings must be of a substantial character, must have at least ½ inch of solid insulation between grooves for parallel wires, and at least ¼ inch backing between wires and walls and ceilings; the moulding must also have, at least, two coatings of waterproof paint or shellac.

Concealed Work other than Conduit Work. — There are several kinds of work that come under this class. There is the building that is wired during construction, the wires being run on porcelain or other approved insulators on the studding or on the sides of, or run through porcelain-bushed holes in floor timbers, short pieces of tubing being used at the outlets. This class of work is used in the majority of dwelling-houses that are wired at the present time: it is also used to a large extent in many old buildings that are wired, portions of the floor being taken up for this purpose. In this class of work in old buildings, the wires are usually run from between the floors to the wall outlets, in an approved flexible tube that is fished between walls.

In some old buildings where it is for various reasons impracticable to run the wires through porcelain work, the wires are run in an approved flexible tubing that is fished from outlet to outlet: this a type of work that is discouraged by the Wire Department and is only approved in such cases as where, in the judgment of its inspectors, the conditions are such that trouble from the wiring is very unlikely.

Then there is what might be called combination types of construction, such as conduit work for branch circuits and porcelain work for the mains, or bushed timbers and concealed porcelain work for branch circuits, and moulding or open-work for mains, etc.

The insulation of all wires used for interior wiring as called for by the rules of the Wire Department is as follows:

The insulation must be solid, at least $\frac{8}{64}$ of an inch in thickness, and covered with a substantial braid. It must not readily carry fire, must show an insulation resistance of four megohms per mile after two weeks submersion in water at 65 degrees Fah., and three days submersion in lime-water, with a current of 150 volts, and after three minutes electrification.

NIAGARA ON TAP.[1]

IT is a curious fact that the proposal to transmit the energy of Niagara a long distance over a wire should have been regarded with so much doubt and scepticism, and that the courageous backers of the enterprise should have needed time to demonstrate that they were neither knaves nor fools, but simply brave, far-seeing men. We have to-day parallel instances to Niagara in the transmission of oil and natural gas. Oil is delivered in New York City over a line of pipe, which is at least 400 miles long, and which has some thirty-five pumping-stations *en route*, the capacity of the line being 30,000 barrels a day. All that oil has first to be gathered from individual wells in the oil region, and delivered to storage-tanks with a capacity of 9,000,000 barrels of oil. Chicago, Philadelphia and Baltimore are centres for similar systems of oil-pipe, running hundreds of miles over hill and dale. Now, how improbable such a plan would have seemed if propounded at the beginning of this century to the plain captain of a New Bedford whaler. As for natural gas, that is to-day sent in similar manner over distances of 120 miles, Chicago being thus supplied from the Indiana gas-fields, and the gas has its pressure raised and lowered several times on its way from the gas-well to the consumer's tap, just as though it were current from Niagara.

We must not overlook some of the fantastic schemes proposed for transmitting the power of Niagara before electricity was adopted. One of them was to hitch the turbines to a big steel shaft running through New York State from east to west, so that where the shaft passed a town or factory, all you had to do was to throw on a belt or some gear-wheels, and thus take off all the power you wanted. More reasonable, though, perhaps, not much less infinitely expensive, was the plan to have a big tube from New York to Chicago, with Niagara Falls at the centre, and with the Niagara turbines hitched to a monster air-compressor, which should compress air under 250 pounds pressure to the square inch in the tube, as under the other plan, all you had to do, if needing power, was to tap this compressed air-tube and get what you wanted. But Niagara certainly was not destined to blow her own trumpet in that longitudinous way.

So far as actual electrical long-distance transmission from Niagara is concerned, it can only be said to be in the embryonic stage, for the sole reason that for nearly a year past the Power Company has been unable to get into Buffalo, and that not until recently has it been able to arrive at acceptable conditions, satisfactory alike to itself and to the city. Work is now to be pushed at once, and, in less than a year, power from the Falls will be in regular delivery to the local consumption circuits at Buffalo, 22 miles away. For the transmission of the first 10,000 horse-power to Buffalo it has been decided to use the pressure or potential of 10,000 volts, with such arrangements at each end that 20,000 volts can be used if necessary. There will be no difficulty about this work. The company has carefully secured rights of way for its pole lines, and the conditions have already been dealt with in other places, as many of you are aware. The 105 miles transmission from Lauffen to Frankfort, in 1891, was at the pressure of 40,000 volts. Many mines in this country, up in the mountains, now have their power brought to them over miles of line. From the San Antonio Cañon, in Southern California, electric power, generated by the melting snows of the mountains, is sent at a potential of 10,000 volts to San Bernardino, nearly 30 miles away, for both light and power. At Guadalajara, Mexico, the General Electric Company has a transmission circuit of 18 miles and 11,000 volts; and it has another at Pachuca, under construction, of 23 miles. A famous high-voltage, alternating-current transmission in Europe is that from the Falls of Tivoli, on pole lines, to Rome, a distance of 17 miles. This year has witnessed the celebration, by the City of Sacramento, Cal., with beating of drums, firing of cannon, street parades, per-fervid oratory and lavish illuminations, of a transmission of power at 11,500 volts from Folsom, 23 miles away. Salt Lake City is now to be supplied with power from eight lakes up in the famous Wahsatch Mountains. It will be seen that the Buffalo problem is well within easy handling, and, with growing knowledge and better apparatus, the conditions for such work improve all the time. For example, the circuits are carried by triple-petticoated insulators of porcelain, and these are now cured to withstand a pressure of 90,000 volts before a puncture can be made. In short, a line efficiency between Niagara and Buffalo of at least 90 per cent is looked for, so that for every 10,000 horse-power passed into the step-up transformer on the brink of the canal at Niagara, 9,000 horse-power will be taken off by the step-down transformers in the receiving station at Buffalo. It is also believed that the power can similarly be sent to Albany, on poles along the Erie Canal, at a loss of about 60 per cent, so that 10,000 horse-power at Niagara would represent 4,000 horse-power available for distribution at the junction of the Erie with the Hudson, 300 miles away.

But the question arises, and has been fiercely discussed, whether it will pay to send the current beyond Buffalo; whether it is worth while to reach out to Rochester, Syracuse and Albany; whether, in fact, it is even worth while to take it to Buffalo, the centre of cheap coal, cheap oil and cheap natural gas. I, for one, cannot help thinking that Niagara power will compete favorably with other power in Buffalo: for recent official investigations, made by Mr. H. A. Foster, have shown that steam-power in large bulk, under the most favorable

[1] Extract from a lecture by Mr. T. Commerford Martin before the Franklin Institute, Jan. 3, 1896, and published in the *Journal* of the Institute.

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conditions, costs to-day in Buffalo $50 per year per horse-power, and upwards. Evidently, Niagara power, starting at $10 on the turbine shaft, or, say, $18 on the line, has a good margin for effective competition with steam in Buffalo.

Now, as to the far-away places. The well-known engineers, Professor Houston and Doctor Kennelly, have made a most careful estimate of the distance to which the energy of Niagara could be economically transmitted by electricity. Taking established conditions, and prices that are asked to-day for apparatus, they showed that even in Albany or anywhere else in the same radius — 330 miles from the Falls — the converted energy of the great cataract could be delivered cheaper than good steam-engines on the spot could make steam-power with coal at the normal price there of $3 per ton. I do not now propose to go into controversy or details, but I do make bold to say that when such conclusions are reached and find support, the time is certainly on us when we must deal with these long transmissions of electrical energy as new factors in the industrial commercial life of the State and Nation.

You must have been impressed with the fact shown in this brief running comment on the situation, that what this enterprise at Niagara aims to do is not to monopolize the power, but to distribute it; and that in this way it makes Niagara more than it ever was before the common property of the citizens.

After all is said and done, very few of us ever see the Falls, and then only for a chance holiday once in a lifetime; but now the useful energy of the cataract will be made cheaply and immediately available, every day in the year, to hundreds and thousands, even millions, of people, in an endless variety of ways. If this be not to make Niagara a common heritage, then I do not know what the phrase means.

Perhaps some of you remember the story about Miss Porter, a member of the family that was once in possession of the Niagara region. She was travelling in Europe, and at dinner one night her companion said: "Oh, if you are an American, I suppose you have seen Niagara Falls." She turned on her escort haughtily, and fixing a stony glance on him, said, "I own them." We can now all say with Miss Porter, "We own them."

We must not omit from our survey the Erie Canal, in the revival and greater utilization of which, as an important highway of commerce, Niagara power is expected to play no mean part. In competition with the steam railway, canals have suffered greatly the last fifty years. In our own country, out of 4,468 miles of canal built at a cost of $214,000,000, about one-half has been abandoned, and not much of the rest pays expenses, which is what you might expect when you race a mule barge against a fast freight train. Yet, canals have enormous carrying capacity, and a single boat will hold as much as twenty freight-cars can, so that obviously if you give the canals cheap, good power, you can do for them what has now been done for the street-car lines, by devoting the horses to the canning industry. In other words, give the canals cheap electric power and we shall again have them a powerful factor in the equalization and minimizing of freight rates. I am glad to say that this has already been recognized by our own State authorities, who have agreed to conditions by which Niagara energy can be used to propel the canal-boats at the rate of $20 per horse-power per year. Where steam-boat haulage for 240 tons of freight now costs about 13 cents a boat-mile, it is estimated that electric haulage will cost not to exceed 10½ cents, while, with the energy from Niagara at only $20 per horse-power per year, it will cost much less. Evidently this is a task worth attempting. Some two years ago the first attempt was made in this country and on the Erie Canal, with the canal-boat *F. W. Hawley*, when the trolley system was used with the motor on the boat, as it is on an electric car, driving the propeller as if it were the car wheels. But the better and cheaper way is to modify the plan of hauling your boat from the tow-path, and this is what is now being done with the electric haulage system of Mr. Richard Lamb on the Erie Canal at Tonawanda, near Niagara. Imagine an elevator system working lengthwise instead of vertically, and you will get a rough idea of the arrangement. There is placed on poles a heavy fixed cable, on which the motor truck rests, and a lighter traction cable is also strung, that is taken up and paid out by a sheave, as the motor propels itself along, and pulls its canal-boat to which it is attached. If boats come from opposite directions they simply exchange motors, just as they might mules or locomotives, and go on without delay. There is no reason why the whole of the Erie Canal should not be equipped this way for freight, and if the canal be deepened, a so much higher rate of speed can be obtained that it might even pay poor people to travel again by canal-boat as it once did our grandfathers and fathers. I can imagine worse travelling experiences than a trip along the picturesque Erie without dust or smoke, at the rate of 5 or 6 miles an hour on the broad deck of a comfortable "canal greyhound."

We might digress on many such pertinent and allied themes; as, for example, the operation of the New York Central Railroad by electric power from Niagara, but must leave them, not only for the present moment, but also for the coming years, which alone can show all the wonderful possibilities of this noble and, I am firmly convinced, profitable enterprise. Before I close, there are two other points, however, to which I ought to direct attention. One is to the fact that, on its property at Niagara, the Power Company has already begun the development of the new village, called Echota, a pretty Indian name, which signifies "Place of Refuge." I believe it is Mr. Howells who, in kindred spirit, speaks of the "repose" of Niagara. It was laid out by Mr. John Bogart, the New York State Engineer, and embodies all that is best in sanitation, lighting and urban comfort. That which was waste wilderness blossoms as the rose, not figuratively, but literally, and it does not need the eye of faith to see here the beginning of that which is destined to be the beautiful centre of one of the busiest, cleanest, prettiest and healthiest cities in the Union. The workingman, whose factory is not poisoned by smoke and dust, whose home was designed by McKim, Mead & White, whose streets and parks were laid out by distinguished engineers, and whose leisure is spent within sight and sound of lovely Niagara, has little cause for grumbling at his lot.

My final comment is upon the interesting strategy with which our American company has also preëmpted the great utilization of the Canadian share of Niagara's energy. Thus far I have dealt only with the work done and contemplated on our own side of the river, but I now show you the plan appproved by the Canadian Government for the Company's work on their side. This plan, not yet carried out, proposes the erection of two power-houses of a total ultimate capacity of 125,000 horse-power. Each power-house is fed by its own canal, and is, therefore, an independent unit. Owing to the better lay of the land, the tunnels carrying off the water discharged from the turbines will have lengths, respectively, of only 300 and 800 feet, thus avoiding the extreme length and cost unavoidable on our side. In one of the designs it has been suggested to put the dynamos underground alongside the turbines, at the bottom of the shaft; but I hardly think that this damp, rheumaticy, but ingenious scheme will be adopted. With both the Canadian and the American plants fully developed, no less than 350,000 horse-power will be available, while the stationary engines now in use in New York State represent only 500,000 horse-power. Yet the 350,000 horse-power are but one-twentieth of the 7,000,000 horse-power which Professor Unwin has estimated the Falls to represent theoretically. If the 350,000 horse-power were estimated at $20 per year per horse-power, and at Niagara should replace the same amount of steam-power at $50, the annual saving for power in the State would be more than $10,000,000 per year — an accomplishment that within a very few years may give Niagara a stronger claim to the admiration of the Empire State than it has ever had before.

Let me not transgress any longer on your time and attention with diagrams and data, but once more, by way of conclusion, emphasize the truth, that this splendid engineering work leaves all the genuine beauty of Niagara untouched. It may even help to conserve the scene as it exists to-day, for the terrific weight and rush of waters over the Horse-shoe Fall is eating it away and breaking its cliff into a series of receding slopes and rapids; so that even a slight diminution of the whelming mass of wave will, to that extent, lessen disruption and decay.[1] But be that so or not so, those of us who are lovers of engineering can now, at Niagara, gratify that taste in the unpretentious place where some of this vast energy is reclaimed for human use, and then, as ever, join with those who, not more than ourselves, love natural beauty, and find with them renewed pleasure and delight in the majestic, organ-toned and eternal cataract.



DETROIT ARCHITECTURAL SKETCH-CLUB.

AT the last meeting of the Detroit Architectural Sketch-Club, Mr. John Chase, of Boston, was a guest of the Club, and gave a short address and a criticism of the sketch problems of the previous meeting of the Club. At the second regular meeting, Mr. Alexander Trowbridge, of Detroit, criticised the summer sketches, and supplemented his remarks with many points of interest to those studying color work.

The Club has added a Modelling Class to its Saturday afternoon work, and the large attendance at all of the classes vouches for the interest taken by the Club members.

The first competition given by the Detroit Chapter A. I. A., and open only to Club members, is now in the hands of the Club, and the drawings must be handed in before December 21, 1896. The programme calls for a Gate Lodge and Arch Entrance to the new Palmer Park, located at the end of the Hamilton Boulevard. The cost of the structure was limited to $25,000. The prizes are: First, Gold Medal; Second, Silver Medal; Third, Honorable Mention.

E. A. Schilling, *Secretary.*

SOCIETY OF BEAUX-ARTS ARCHITECTS.

The annual meeting of the Society was held on Monday, November 23d, at the Café Fleuret, New York City. Twenty-eight members attended and an unusual interest was shown.

The business meeting opened with an address by the retiring President, John M. Carrère, who referred to the progress made by the Society during the past year in its educational work, its relations

[1] Professor Shaler, of Harvard, has suggested the buttressing of the cavities under the falling sheet of water, with masonry, so as to hold up the superincumbent strata.

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with other societies and its own individual strength. He added a word of caution and advice, urging the Society to pursue a conservative course in endeavoring to extend its influence, and especially counselling it to maintain and strengthen its friendly relations with other societies.

Report of officers were read and the annual election held, which resulted as follows: *President*, Walter Cook; *Vice-President*, Edward P. Casey; *Secretary*, Edgar A. Josselyn; *Treasurer*, Joseph H. McGuire; *Corresponding Secretary*, John E. Howe; *Executive Committee* (to fill vacancy), Ernest Flagg; *Committee on Education*, Thomas Hastings, Edward L. Tilton, Thornton F. Turner.

The new President, Mr. Cook, made an address endorsing the principles that had governed the past administration, and further expressing his own conception of the proper sphere of action for the Society. He particularly emphasized his belief that the members, in their individual work, should follow and express the fundamental principles of architecture as taught at the École des Beaux-Arts, but at the same time not feel bound to adhere to any set of forms, but to seek to interpret these principles with the same variety of expression that characterized the differences in the work of the different ateliers. He also entertained a hope that some coöperation with the architectural department of Columbia College might be brought about.

Minor items of business were transacted and four new members were elected, Messrs. Blake, Laflin, Totten and Atherton.

EDGAR A. JOSSELYN, *Secretary.*

SKETCH-CLUB OF NEW YORK.

THE regular monthly meeting of the Sketch-Club of New York was held in the Club-rooms, No. 3 East 14th Street, Saturday evening, December 5, 1896.

Mr. Robt. C. Sconce, Vice-President, occupied the chair.

The class in Architectural Research reported considerable work and progress by its members; a full meeting of this class was held Saturday, November 14th, when the papers were read and drawings submitted. They were all carefully prepared, but those especially worthy of praise were by Messrs. Housemann, Kriss, Field and Ginsburger. The next meeting of this class will be held Saturday, December 12th, 8 P. M.

Mr. Nolan reported that the Monday and Saturday evening Life Classes had a full complement of members and that four applications had been received for a third class, proposed for Wednesday evenings.

Mr. J. J. McGinnis will meet his class in Pen-and-ink Rendering, Thursday, December 10th, 8 P. M.

A "Xmas smoker" was announced for Saturday, December 19th.

The meeting adjourned at 9.15 P. M., when refreshments were served in place of the dinner which usually precedes the business meeting. HARRY P KNOWLES, *Recording Secretary.*

THE T-SQUARE CLUB OF PHILADELPHIA.

PROBABLY the most enjoyable and enthusiastic regular monthly meeting ever given by the T-Square Club was held on December 2d, at the offices of Mr. Guy King, 431 Walnut Street. The Club tendered President David K. Boyd, who had recently returned from an extended tour through England, France and Italy, a very cordial reception. An interesting programme had been arranged, entitled "General Waiting-room in an Important Terminal Station," treatment to be monumental, by Mr. F. M. Day, who also lead the criticism of the evening. The force of Mr. Day's unflinching criticisms in referring to the utilitarian and artistic aspects of this problem met with much approval and admiration. He also commended very highly those who considered a good general arrangement paramount to minor and insignificant details. First Mention was given to Oscar Wenderoth; Second Mention, John Molitor, and Third Mention, W. C. Hays. CHAS. E. OELSCHLAGER, *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF MRS. T. B. WILLIAMS, 304 COMMONWEALTH AVE., BOSTON, MASS. MR. J. A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.

[Gelatine Print, issued with the International and Imperial Editions only.]

THIS house, which has a frontage of 35′ and a depth of 105′, is built of light Indiana limestone.

STAIRCASE OF FRANCOIS I, CHÂTEAU DE BLOIS, FRANCE. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE, NEW YORK, N. Y.

[Issued with the International and Imperial Editions only.]

SEE article elsewhere in this issue.

SECTION OF THE SAME STAIRCASE.

DETAILS OF THE SAME: TWO PLATES.

THE OLD ROYALL HOUSE, MEDFORD, MASS.

THIS old mansion, which dates from 1737, received much attention during the "Historic Festival" which was held in this old Massachusetts town during the month of October last. A full history of the building itself may be found in our issue for Oct. 13, 1888.

PROPOSED ALTERATION AND ENLARGEMENT OF THE STATE-HOUSE, COLUMBUS, O. MESSRS. YOST & PACKARD, ARCHITECTS, COLUMBUS, O.

[The following named illustrations may be found by reference to our advertising pages.]

SOUTH AND WEST ELEVATION OF ROYALL HOUSE, MEDFORD, MASS. MEASURED AND DRAWN BY MESSRS. A. C. FERNALD AND F. C. ADAMS.

DETAILS OF WEST ELEVATION OF THE SAME.

DETAILS OF EAST ELEVATION OF THE SAME.

[Additional Illustrations in the International Edition.]

DETAIL OF THE FACADE OF THE RAILWAY-STATION, FRANKFORT-ON-THE-MAIN, PRUSSIA. HERREN EGGERT & FAUST, ARCHITECTS.

[Gelatine Print.]

BASE OF ELECTRIC-LIGHT MAST IN FRONT OF THE RAILWAY-STATION, FRANKFORT-ON-THE-MAIN, PRUSSIA. HERREN EGGERT & FAUST, ARCHITECTS; HERR F. KRÜGER, SCULPTOR.

[Gelatine Print.]

HOUSE, NO. 8 MOZARTSTRASSE, LEIPSIC, SAXONY. HERR HUGO FRANZ, ARCHITECT.

[Gelatine Print.]

UNION BANK OF AUSTRALIA, CORNHILL, LONDON, ENG. MR. GOYMOUR CUTHBERT, ARCHITECT.

BANKING HALL IN THE SAME BUILDING.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

TESTS OF THE STRENGTH OF OLD TIMBERS.

NEW YORK, December 2, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— I enclose herewith a summary of the results of tests made by me, believing them to be of sufficient interest to the profession. These tests were conducted at my own expense to determine some values for these materials, and while they have not been sufficient to determine these as standard, they have proven that this material, after having been in use several years, has not the strength advocated by experimentalists upon newer materials. I hope later on to continue these tests under varying conditions.

I was led to inaugurate these tests by a dispute with the Department of Buildings in a case, the determination of which involved a decision affecting the existence of a large number of buildings in this city, and I must confess myself surprised at the low results attained.

THE results of this series of tests on the transverse crushing strength of old timbers used in factory construction give further light on this important subject, and have a direct bearing upon the question of the strength of existing structures. These tests were conducted with the intention of obtaining some data with which to judge the allowable strength for those parts of existing buildings in which such strains occurred, as where wooden columns and girders

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are used, the latter being sandwiched between the columns without dowels or pintels, and being compelled to transmit the vertical strains; also bolster caps and bases, ends of headers and tail-beams, the area of bearing of beams in bridle-irons and of some of our patented bridle-irons on the beams. The point of strain taken was at failure, and although after this the specimens, excepting white pine, would stand strains up to the limit of the testing-machine (2,000 pounds per square inch), the increase of pressure would be followed by such increased smashing that it would be impossible to determine the value for the strength of the piece. While the factor-of-safety should be variable, depending upon the location of the member in the structure, still the New York and Brooklyn laws require a factor of four, and, consequently, one-fourth of these values should be taken.

Yellow Pine, 974 lbs.	per	square	inch.
White Pine, 550	"	"	"
Oak Pine, 1,200	"	"	"

In other words, when such material is subjected to greater strains than one-quarter of the above values, it is loaded beyond its safe limit.

Oscar Lowinson.

THE FAIRMOUNT PARK ART BUILDING.

To the Editors of the American Architect: —

Dear Sirs,—About a year ago a competition was held for designs for an "Art Building in Fairmount Park, Philadelphia, Pa."

The competition attracted much attention, as the building was to be a large, monumental structure, one of the conditions being that it should "at least be equal, if not superior, to any similar building in the world." The estimated cost was four to five millions of dollars.

About one hundred designs were received, and the Park Commission instructed a jury of prominent architects to select the best eight designs, presumably intending to choose from these one design for execution and three others for the stipulated award of premiums.

The jury selected the eight designs and also designated the four, which appeared to them the best, in their order of merit. Upon opening the sealed envelopes containing the names of the architects, it was found that three designs were by New York architects and one by a French architect.

Objection was raised by the press to the contemplated award, the claim being made that the jury exceeded its authority in doing more than select eight designs as instructed, leaving the selection of the four best to the Park Commission. What action, if any, has been taken by the Park Commission since then is not known; in fact, it is not certain that the above information is entirely correct, as it has been obtained from somewhat contradictory newspaper reports.

If you can give any reliable information regarding the present status of the competition, it would be appreciated by

"Competitors."

[We have ascertained that within a short time after the making of the awards the premiums were duly paid to the several architects, but that nothing further has been done, presumably for the reason that the city has made no appropriation that would enable any further steps to be taken. It also appears from the minutes of the jury, under date of November 26th, that "the directions of the committees to the Board of Experts and the further instructions given them in Philadelphia, would seem to require them to select: (1) The eight best of the plans submitted, and (2) The four plans which under the given conditions should receive the prizes." We apprehend that as the award was made on this understanding, competitors have no reason for assuming that the Board of Experts exceeded its delegated powers.—Eds. American Architect.

THE WIDTH OF HORSE-STALLS.

New York, N. Y.

To the Editors of the American Architect: —

Dear Sirs, — In Mr. C. H. Blackall's very excellent article on "Stables," in your issue of November 14th, I notice the following:

"A single stall more than 5′ wide is not advisable, as a horse is very apt to become stalled therein and rendered perfectly helpless. A good width is 4′ 6″, though experience in large boarding-stables shows that 4′ will answer, etc."

In "*Kidder's Pocket-book*" (edition of 1891), under miscellaneous memoranda appears the following:

"*Horse-stalls.*—Width, 3′ 10″ to 4′, or else 5′ or over in width, . . . Width should never be between 4′ and 5′, as in such cases the horse is liable to cast himself."

You will notice there is some discrepancy and, perhaps it would be useful to many of your readers to know which is to be taken as correct.

Yours truly, James Pickles.

[It is not possible to fix a least dimension for stalls which will suit horses of all heights and sizes, and of all degrees of intelligence and activity. Horses are cast in many complicated positions and when found in the morning, it is not easy to find out either why or how the accident should have happened. As a rule, the manner in which the horse is tethered is quite as often the cause of accident as is the width of the stall. Ordinarily, the question for owner and architect to decide is whether they will permit to the horse any temptation to roll in his stall. When this luxury is to be risked, the width of 6′ 2″ recommended by an English writer is little enough. For horses of ordinary size and reasonable intelligence, if properly tethered, we believe the figures given by Mr. Kidder will afford sufficient safety and comfort. — Eds. American Architect.]

A CORRECTION: "ADJUSTABLE FACING."

Because of a somewhat obscure chirography, the name of the writer of a communication under the above caption in our issue for November 28th, was given as John Louis Pelton, whereas, the middle name might have been correctly read as "Cotter."

NOTES AND CLIPPINGS

Ceramic Stone. — The name of "Ceramic Stone" has been given by M. Garchey, a French inventor, to a new building-stone obtained by him from broken glass. The glass — broken bottles, window-panes, etc., — is reduced to powder; different kinds are mixed if variegated color is desired, and the pulverized material is devitrified by passing successively through two furnaces, the second being one of high temperature. The pasty mass is then passed under a press, which gives it shape and consistence. — *The Churchman.*

Antwerp's Prix de Rome. — Antwerp's great art school is regarded by that city's inhabitants as its most important institution, and to win the Prix de Rome there is to become the object of stately municipal honors. This year the prize fell to a young artist named Arthur Sterck, and he has just been made the principal figure in a procession that recalled the triumphs of conquerors of nations. In a landau drawn by four magnificent horses, decorated with the colors of Antwerp, preceded by three regimental bands, and followed by the mace-bearers of the Academy, numerous groups of citizens, with the banners of their respective societies, he was escorted to the Academy, where speeches of congratulation were delivered. From there he was conducted to the Hôtel de Ville, where the Burgomaster and Aldermen, in their robes of office, congratulated him in the name of the city. — *N. Y. Times.*

Sea Baths and the French Salt-tax. — A great amount of criticism is being levelled at the present moment against the French authorities along the seacoast, for their action in forbidding the bringing of sea-water into the houses for bathing-purposes, and the newspapers are asking whether the Government is afraid that the sea may be emptied. The *Journal officiel*, at Paris, however, explains that the officials are only doing their duty. There is a tax on salt. Sea-water contains salt, and sea-water is, therefore, liable to the salt taxes on that basis. By Clause IX of the law of 1840, enacting the salt dues, it is forbidden to "take or transport salt-water or saliferous matter for any other destination than that of a factory regularly authorized by the State for the purpose, unless special permission has been obtained from the revenue authorities." It is the existence of this law which prevents the removal on the French coasts of even a single pail of sea-water from the ocean. — *N. Y. Tribune.*

William II as an Architect. — As a statesman, soldier, sailor, preacher, painter and musician, the Kaiser has afforded to the contemporary world successive glimpses of his many-sided genius. It is probable, however, that posterity will be most concerned with William II, as an architect. He is endowing Berlin with a couple of buildings which bid fair to rival in their colossal proportions the monuments of Nineveh and Babylon. On the far from ample space at the end of the famous Unter den Linden Avenue, between the Schloss and the Museum, is being reared the new Lutheran Cathedral — a gigantic structure in the form of a Greek cross. The dome, it is said, will eclipse that of St. Peter's at Rome, and only in the length of the nave will the older basilica have any advantage in size. As the scaffolding already indicates, this mass of stone, embodying a curious variety of styles, must completely crush into insignificance the adjoining palace. To complete the work of effacement, the Brobdignagian memorial of William I is in process of erection within fifty feet of another front of the castle. The huge hemicycle, which forms a sort of pedestal, runs up to a height of nearly eighty feet and dwarfs everything in its neighborhood. However uneventful his reign may prove, William II will certainly have left his mark on the Prussian capital. — *St. James's Gazette.*

M. Pasteur's Tomb. — The tomb of Pasteur, which is now in course of construction under the direction of M. Charles Girault, may be said to have some affinity, although it will be on a much smaller scale, with the great tomb of Napoleon in the Invalides. It forms a part of the Institut Pasteur in the Rue Dutot, for the crypt which is to contain the sarcophagus has been excavated to a depth of about sixteen metres, or fifty-three feet, below the vestibule. The approach will be down a vaulted staircase. Above the entrance to it is a cartouche containing as an inscription a thought of Pasteur's, to the effect that "He is happy who carries in his mind and obeys a God, an Ideal of Beauty, an Ideal of Art, an Ideal of Science, an Ideal of Patriotism, an Ideal of the Evangelic Virtues." The central part of the floor of the crypt is raised to form a daïs in mosaic for the sarcophagus, which will be of Swedish porphyry. Over it is a cupola, supported by twelve porphyry columns with Ionic capitals. Facing the staircase is a small chapel or apse. The cupola is covered with mosaic. In the centre are four winged figures, designed by M. Luc Olivier Merson, symbolizing "Faith," "Hope," "Charity" and "Science." Around are figures of the vine, hop and mulberry, which suggest Pasteur's discoveries in fermentation, and figures of animals that were the subjects of his later investigations. The walls are veneered with marbles, while the steps, as well as the bases and capitals of the columns, are in white marble. The whole structure is worthy of the man it commemorates, and in his Institut it has a significance which it could not possess if it were erected in one of the Parisian cemeteries. — *The Churchman.*

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THE New York Departments have some queer ways of treating the public. It will be remembered that, a few months ago, an order was sent out by the Commissioner of Public Works, directing that the fees payable to the city for the privilege of constructing vaults under the sidewalks should be raised from seventy-five cents per square foot, the rate which had been maintained for many years, to two dollars. This order produced a good deal of dissatisfaction, and not without reason. It is doubtful whether any tax at all can legally be demanded for such use of the space under the sidewalk as does not interfere with the comfort and security of the public, and, while owners will pay seventy-five cents a square foot rather than quarrel with the city authorities, a tax of nearly three times that amount is a serious matter. The opposition made to the new imposition, instead of leading the city officials to inquire more carefully whether they were in reality illegally oppressing the public whose servants they are, seems to have infuriated them, and the next step taken by them can only be characterized as a high-handed outrage. One of the municipal regulations, which applies to all the newer part of the city and has been for many years in force, provides that a space, usually, five feet in width, shall be reserved in front of the building-line, in which may be constructed the steps leading from the street down to the basement door, or the whole of which may be sunk below the level of the sidewalk, to give light to the front basement windows, the only condition attached to its use in this way being that a railing must be constructed around it, to prevent people walking on the sidewalk from falling in. In cases where residential streets have been invaded by business, it has been customary for the owners of stores fronting on them to carry out the spirit of this regulation, with more convenience, both to themselves and the public, by covering this area with sidewalk lights, and using the space under it for their own purposes, at the same time that the public has the benefit of the extra width added to the sidewalk. So well understood was it that the area space belonged to the owner of the building to use as he pleased, so long as the front of the building did not encroach upon it, that in many business streets there are steps along the "area line," dividing the sidewalk proper from the portion intended for the use of the abutting owner; and, while the seventy-five-cent tax was paid to the city in case the owner desired to use space under the sidewalks beyond the area line, no one dreamed of demanding or paying any tax for the use of space within the area line, for the obvious reason that the owner was legally entitled to use this space for light and access to his basement, and could have left it open to the air, with a railing; and it was desirable to encourage him to add it to the sidewalk space by means of a covering which was, as a rule, far more advantageous to the public than to him.

A FEW days ago the Department of Public Works, without notice or hearing, issued an order to the effect that all covered areas, even though covered only with gratings, should be considered as vaults under sidewalks, and that the new tax of two dollars per square foot should be applicable to them, as well as to space under the sidewalk proper. As the legality of this ruling is, to say the least, extremely questionable, and as it contravenes the practice and precedent of something like thirty years, one might suppose that the first case under it would be treated in a reasonable and considerate manner, in such a way as to test its legality without unnecessarily injuring property-owners, or involving the city in suits for damages; but the Commissioner of Public Works, who seems to prefer to do his reasoning with a club, thought otherwise. Mr. Charles Buek, a well-known builder, is erecting an apartment house on Amsterdam Avenue. The rules of the Building Department provide that an area shall be constructed on all street-fronts of such buildings, to give light to the basement, and that a staircase shall be placed in this area, for access from the basement to the street; but that "where stores are located on the first floor the area may be covered with suitable vault-lights or gratings." Mr. Buek made his contracts in accordance with this regulation, including gratings over the areas. Some of the gratings were in place, and others were being set by the contractors, when an order was sent them to desist. No previous notice had been given to them, or to Mr. Buek, of the new rule. Mr. Buek wrote to the Department, and, while naturally questioning the legality of the ruling, offered, rather than open a long legal controversy, to submit the matter to any court that the Commissioner of Public Works might select, and abide by its decision. At the same time, by the advice of his counsel, he permitted his contractor to finish the work of setting the gratings, in pursuance of the contract, and of the express permission given by the rules of the Building Department. The Commissioner of Public Works paid no attention to his offer to submit the matter to any court, and, apparently, did not even take the trouble to make a demand for the tax-money, upon which the question could have been brought before some sort of tribunal, but, as alleged, simply sent a gang of men, who tore up the gratings, broke them to pieces, and threw the fragments into the area, where they still lie; and we venture to predict that, if Mr. Buek will stand up for his rights, the City of New York will have to pay for taking them out, and repairing and replacing them, with a substantial bill of damages besides, and that Mr. Buek will not have to pay two dollars a square foot, or any other sum, for the privilege of keeping them there.

THE New York *Herald* makes some observations as to the probability of a general settlement of the high buildings on the lower part of Manhattan Island, which have an unnecessarily alarming look to people not accustomed to dealing with large figures. Adding up approximately the weights on the foundations of the highest buildings, it finds that something like "a hundred billion pounds" weight has been imposed upon the alluvial gravel which consitutes the subsoil of the island below Canal Street. Although sand or gravel form good foundations when prevented from escaping, it is possible for them, under certain contingencies, to escape, and the buildings imposed upon them are in that case likely to settle. With the gravelly part of Manhattan Island, the probability of such an accident is, it seems to us, diminished, rather than increased, by the modern methods of building. Although sand will try to escape laterally under a heavy load, its tendency to lateral movement is resisted by the weight of the earth resting upon the sand just outside the footings; so that, while a building set upon top of a layer of sand would soon sink, through the almost unopposed escape of the sand from beneath the footings, it would stand firmly on the same sand, if its footings were

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laid so far beneath the surface that the tendency to lateral movement of the sand under them would be counteracted by the resistance due to the increased weight upon the sand just outside the footings. With heavy buildings, unless their cellars are excavated to the rock, the principal object of making deep foundations is to secure as much lateral resistance as possible to oppose any tendency to escape of material from under the footings. Keeping this in mind, it will be seen that the load of buildings on the lower part of Manhattan Island diminishes, instead of increases, the probability of the settling of any one through lateral escape of the subsoil; just as a skilful architect, where a building shows signs of settlement through insufficient depth of foundation, will often apply a temporary remedy by piling up earth immediately around the building, for the purpose of increasing the lateral resistance of the subsoil. In the case of buildings of extraordinary weight, standing on foundations which extend to a great depth, there is a real danger that the excavation for the deeper cellar may allow the soil under the neighboring buildings, less deeply planted in the ground, to escape; but this danger is well understood, and so carefully guarded against that, so far as we know, few accidents attributable to such a cause have occurred in connection with the erection of any of the lofty office-buildings; and, once safely poised upon their deep foundations, the high buildings form, in a certain way, buttresses, which add to the security of the lighter structures about them.

THE true danger to be apprehended in regard to the modern office-buildings of mixed steel and masonry construction is from rust. No one knows exactly how the metal in such structures is going to behave, for the reason that such combinations have never before been exposed in the same manner to the action of the elements. We know that iron, buried in the heart of thick stone walls, laid in lime mortar, has remained unchanged for seven or eight centuries, presumably through the alkalinity of the lime, which has been known for ages as a powerful preventative of rust. Our high buildings are, however, built with cement instead of lime, and not much is known in regard to the action of cement on iron. Chemically, cement is much less alkaline than lime, and as it is insoluble in water, what alkalinity it possesses can hardly have much chemical effect on the metal. Its insolubility, however, makes walls built with it more impervious to water than those built with lime, and, if the steel structure is well grouted with cement, as is customary, there is reason to suppose that the metal, guarded from moisture by its impervious sheath, which, if it does not contribute alkali, at least contains no acid, may last uninjured for a very long period. Such experience as is available confirms this view, and, although architects will watch with great anxiety for any signs of deterioration of metallic structures used in the new manner, as an indication which may assist in devising precautions against such action in future, they have certainly neither forgotten nor neglected anything that the present condition of knowledge affords in the way of information on the subject.

WE often have inquiries as to whether there is any redress against the practice, followed by certain builders, and some owners of the baser sort, of getting plans from an architect, copying them, and using the copies for duplicating the building shown on the original plans. Country builders, entrusted with the execution of plans made by an architect for a house, not unfrequently appropriate the drawings, or surreptitiously copy them, and utilize them to reproduce the house for other customers; while owners of bad character have been known to get drawings "on approval" from weak-minded architects, copy them, and after returning the originals as "not approved," proceed to carry out the building from the stolen copies. Most city architects have a provision inserted in their contracts, to the effect that the last payment to the builder under the contract shall not be payable until all the drawings have been returned, but this does not prevent surreptitious copying, and it is very much for the interest of architects and owners that some principle should be laid down, in accordance with which such betrayals of confidence may be promptly punished without the uncertainty which now attends the cogitations of lawyers as to the form of tort which is involved. It seems not impossible that to such cases the law of copyright might be found by the courts to be applicable, by an extension which is undoubtedly within the general principle of copyright, and only needs to be specifically made by a court of record to take its place in jurisprudence. Of course, the copyright established by statute is not applicable, for such copyright can only be secured by compliance with the formalities prescribed by the statute, but there is what is known as common-law copyright, to which no formalities are attached, but which protects in a general manner the rights of authors of literary or artistic works against unwarranted infringement. In 1849 or 1850, a case involving this principle was decided in England, to which very august personages were parties. The Queen of England and the Prince Consort, among the occupations of their younger days, had amused themselves by making some etchings, of which a few copies had been printed and given to their friends. An enterprising individual, named Strange, got hold of the etchings in some way, and undertook to exhibit them to the public, and suit was successfully brought in the name of Prince Albert, to restrain him from doing so.

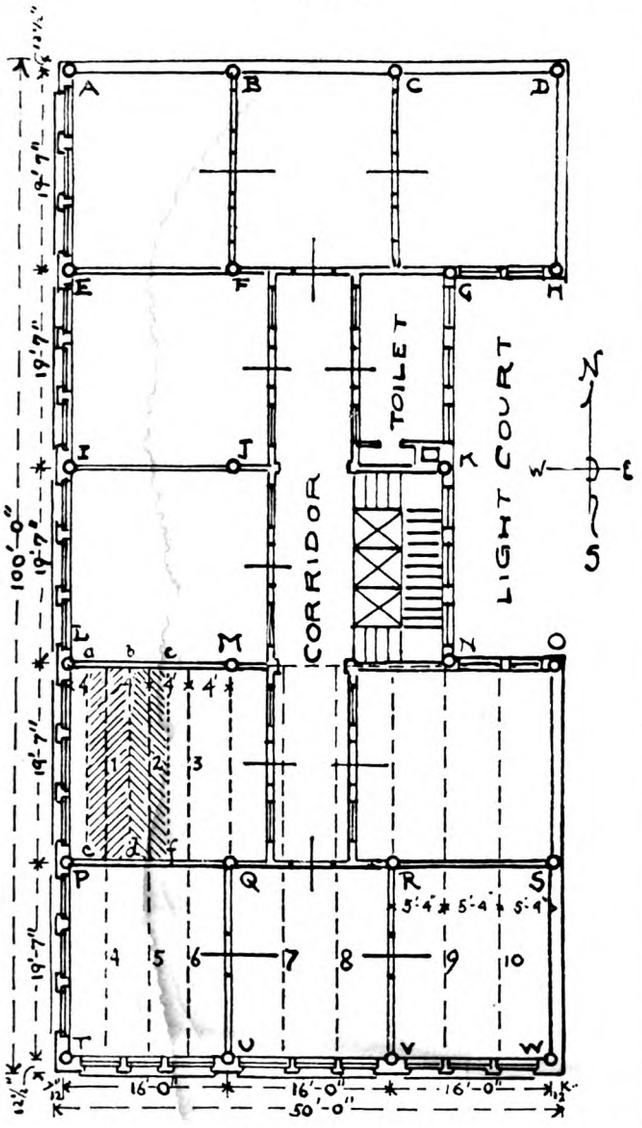
IN a somewhat later case involving the same principle, but applying to a literary work, the Court said that "The right of the author before publication we may take to be unquestionable; he has the undisputed right to his manuscript; he may withhold or he may communicate it, and, communicating, he may limit the number of persons to whom it is imparted, and impose such restrictions as he pleases upon the use of it; and the fulfilment of the annexed conditions he may proceed to enforce, and for their breach he may claim compensation." It was pointed out in this case that the same principle applied to all literary and artistic work, and it would be hard to find any such work to which it would be more appropriate than the plans of an architect, which are obviously intended to be communicated to a limited number of persons, and in regard to which there could be no presumption that they were intended for the benefit of the public, or that their author desired to waive his property-rights in them. There might be a question whether the passage of a copyright statute, providing specified means for securing a monopoly in literary or artistic work, on compliance with certain formalities, did not supersede common-law copyright in matters to which it was applicable, so that a person who neglected to avail himself of his statutory rights, by compliance with the prescribed formalities, could not fall back on the common-law to give him similar protection; but, even in the case of literary works, where it is to be presumed that the author would seek statutory copyright if he wished to keep the monopoly of his work, it is doubtful if he would divest himself of his property rights without a more positive waiver than the mere neglect to seek protection of a certain kind, and with architects' drawings the presumption is entirely in favor of the idea that common-law protection for them, as private property, is all that is desired. What our courts would think of the matter is yet to be shown, but English precedent, where no other is available, has much weight in our jurisprudence, and it certainly seems as if a definite theory upon which such cases could be argued and decided would do much to protect architects and owners against a form of robbery which is, apparently, becoming more and more prevalent.

ALL lovers of popular natural history will remember that, according to that science, English oysters owe their "coppery flavor" and greenish tinge to their habit of absorbing the waste-water from the Cornish copper mines, which flows into the sea not many miles from the oyster-beds, and it is sad to learn that the coppery flavor, as well as the pleasing color, of these expensive mollusks is threatened by certain discoveries which have been made far away from the seashore, in the mines of Montana. From the Anaconda mine flows out a stream of waste-water, which is colored of an emerald green by the compound of copper which it contains. As there are no oysters in the neighboring mountains to consume the liquid, it runs to waste, or rather, it did so until a little while ago, when the managers of the mine took it into their heads to collect the water in immense tanks, covering several acres of ground, and to put into these tanks such old wheelbarrows, railroad iron, rusty pipes, dilapidated elevators and battered tin-ware as they found available. The result of this simple chemical process is to precipitate the copper, by solution of the iron. The action takes place slowly, so that about three weeks is necessary for the complete removal of the copper in a vat of water, but it needs no attention, and the copper is thrown down in the form of a grayish mud, which is nearly pure copper, and is mixed with the other ores for smelting.

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STATICS OF STRUCTURES. — THEORETICAL AND APPLIED.[1] — II.

SIMPLE BEAM WITH UNIFORM LOAD. — PRACTICAL APPLICATION OF CHAPTER I.



— FIG. 11 —

33. LET us proceed to apply the foregoing to the practical problem of a twelve-story office-building. Suppose a typical floor plan, as shown in Figure 11, had been determined upon, and that the sizes of the floor beams were now to be calculated.

For the sake of good elevations, more than anything else, the fifty-foot front was divided into three bays, and the hundred-foot front into five.

This subdivision results in 23 columns, lettered *A*, *B*, *C*, . . . *W*, on the plan; between these columns we decide to place girders, parallel to the narrow front of the building, framing the floor beams between them.

34. To calculate the strength of these floor beams, we shall first apply Equation 6, namely:

$$M = \frac{P\,l}{8}$$

In which M = maximum bending-moment for uniformly distributed load in inch-pounds.

P = total load, *i. e.*, static plus live load;

l = span in inches.

35. The static load, or "dead weight" (§ 7), varies with the kind of material used in the construction of the floor. It is made up of the weight of the flooring or tiling, the cinders or concrete used for levelling, the floor arches, the plaster, the floor beams and such fireproof (thin) partitions as may be carried directly on the floor. It is best, in every case, to calculate as closely as possible the weight of each of these substances, and from this to deduce an average weight of so many pounds per square foot.

Thus a floor in a first-class dwelling-house, if steel beams and very light patent arches are used, would weigh from 50 to 60 pounds per square foot. On the other hand, the floors in most of our modern office-buildings have been calculated for a static load of 100 pounds per square foot; so that the reader had best exercise his judgment and select that weight between 50 and 100 pounds which the case under consideration would seem to call for.

36. The live load to be assumed per square foot is, according to the New York Building-law, as follows:

TABLE I.

Live loads to be assumed, for different types of buildings, per square foot of floor area, according to the New York Building-law:

Dwelling-houses, Apartment-houses, Hotels	70 lbs.
Office-buildings	100 "
Places of Public Assembly	120 "
Stores, Factories, Warehouses	150 "

37. In our case we shall assume the static and the live load each at 100 pounds per square foot, so that we have a total load of 200 pounds per square foot. Each beam sustains a load proportional to its span multiplied by the distance between beams on centres; thus, Beam 1 carries that portion of the floor, marked *a b c d*; Beam 2, *b c d f*; and so on. But *a b c d* is equal to 19′ 7″ by 4′ 0″, or 78.3 square feet. This multiplied by 200 gives the total load on each beam as 15,660 pounds.

Our span is 19′ 7″ or 235″.

Inserting these several values in Equation 6, we get:

$$M = \frac{15{,}660 \times 235}{8} = 460{,}000 \text{ inch-pounds.}$$

The next step is given by Equation 10:

$$\frac{M}{S} = R$$

In which *M* = bending-moment as above, *S* = allowed maximum stress, or safe stress in extreme fibre, or safe modulus of rupture; all meaning practically the same in this case.

R = required moment-of-resistance of cross-section in inches.

Accordingly, we divide 460,000 inch-pounds by the safe modulus of rupture for steel (the material of which we intend to make our own beams), which is 16,000 pounds per square inch, and get as the required moment-of-resistance 28.8″.

38. Before proceeding any farther, let us take this opportunity to explain more fully the meaning of some of the terms just used.

From tests which have been made of beams under different loads, a constant has been derived which may in a measure be said to represent the combined action of the compressive and tensile stresses (§ 10) existing in a loaded beam; this constant has been termed the modulus of rupture.

This modulus, therefore, is the measure for the resistance of a beam against transverse or cross-breaking strains; the *ultimate modulus* is the *greatest* amount of stress that the material is capable of exerting; it would just balance the *ultimate load;* the least load in excess of this would cause the beam to fail.

It would obviously be very foolish to calculate a beam for the ultimate load, thus making it carry all that it possibly could; for our knowledge of the strength of most of the materials being comparatively limited, and the actual loads never quite agreeing with the assumed ones, the chances in such a case would be, that, while the beam might be safe theoretically, practically it would fail.

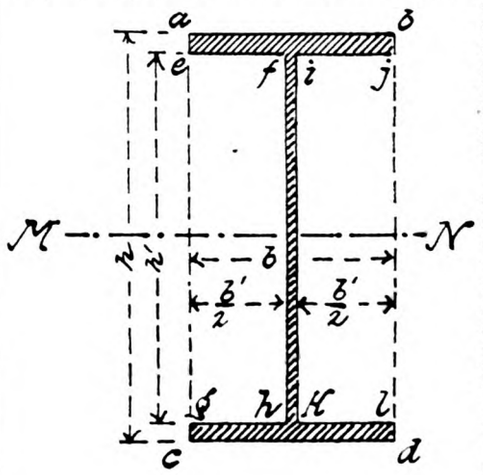


Fig. 12.

Therefore, instead of basing our calculations on the ultimate modulus of rupture, or any other kind of ultimate stress, for that matter, we calculate so that the beam will have to carry at the utmost, say, only $\frac{1}{6}$ of the ultimate load, by decreasing the modulus of rupture to $\frac{1}{6}$ of the ultimate modulus. This decreased modulus necessary to resist this so-called *safe load* is, in its turn, known as the *safe modulus of rupture.* And the ratio of the ultimate load to the safe load, or the ultimate stress or modulus of rupture to the safe stress is called the *factor-of-safety.*

39. Thus if, the ultimate modulus of rupture of steel being 80,000 pounds per square inch, we were to calculate with a safe modulus o

[1] Continued from No. 1093, page 81.

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rupture of 16,000 pounds per square inch (as we are actually doing in our problem), we should be using a factor-of-safety of 80,000 ÷ 16,000 = 5.

Had we used a safe modulus of rupture of 12,000 pounds per square inch, our factor-of-safety would have been 80,000 ÷ 12,000 or 6.66. As a matter of fact, the former factor is used in calculating beams for buildings, and the latter for bridges.

The less we know of a material, or the more it is liable to differ, practically, in its consistency, from what it is assumed to be theoretically; or the more the actual loads are liable to vary from those assumed in the calculations, the larger is the factor-of-safety to be taken.

Thus, for cast-iron we use a factor-of-safety of 8; for yellow pine, 7; for limestone, 10, and so on.

40. Tables of the ultimate and safe resistance of materials may be found in all the hand-books of engineering; we shall give such values as are necessary to our calculations as we go along. At this place we insert the values for steel and iron.

TABLE II.

ULTIMATE AND SAFE RESISTANCE OF IRON AND STEEL IN POUNDS PER SQUARE INCH.

	Compression.		Tension.		Shearing.		Modulus of rupture.	
	Ultimate.	Safe.	Ultimate	Safe.	Ultimate.	Safe.	Ultimate.	Safe.
Cast Iron.....	97,500 to 145,000	15,000	16,300	2,500	19,500 to 25 000	2,500	40,000	5,000
Wrought-iron..	36,000 to 40,000	12,000	48,000 to 57,000	12,000	40,000 to 45,000	8,000	43,000	12,000
Wrought-steel.	90,000	16,000	60,000 to 117,000	16,000	52,000	12,000	80,000 to 100,000	16,000
Cast-steel.....	150,000	25,000	91,000	16,000	57,000	12,000	125,000	16,000

41. To return to our problem: We found the required moment-of-resistance to be 28.8″. We could now find the necessary cross-section of the beam by using Equation 8:

$$R = \tfrac{1}{6} b h^2.$$

But this applies only to rectangular cross-sections, and as steel beams are invariably I-shaped, the equation must be changed to conform to that section.

The I-beam may be considered as a rectangular section *a b c d* (Fig. 12) with the parts *e f g h* and *i j k l* cut out; its moment-of-resistance will, therefore, be equal to the difference between the moments of the whole section *a b c d* and the moments of the parts *e f g h* and *i j k l*.

The moment of *a b c d*, according to § 29, and with the lettering as in Figure 12, is:

$$\tfrac{1}{6} b h^2.$$

That of *e f g h*:

$$\tfrac{1}{6} \cdot \frac{b'}{2} \cdot h'^2$$

And of *i j k l*:

$$\tfrac{1}{6} \cdot \frac{b'}{2} \cdot h'^2$$

The sum of the last two is:

$$\tfrac{1}{6} b' h'^2.$$

Therefore the moment of the shaded or I part is:

$$\tfrac{1}{6} (b h^2 - b' h'^2). \qquad (11)$$

42. If, now, we make use of a rule-of-thumb which says that the depth of a beam in inches is numerically equal to one-half the space in feet, we should arrive at the conclusion that our beam would have to be about 10″ deep. Proceeding farther, we should say that 5″ would be a good width of flange for a 10″ beam, and assuming — just to begin with — a web thickness of $\frac{1}{4}$″, and a flange thickness of $\frac{1}{2}$″, we get the cross-section shown in Figure 13, to which we can now apply Equation 11, and so discover whether we have designed a beam having the required R or not.

Substituting in Equation 11 for b, h, b', h', their respective values 5″, 10″, $4\frac{3}{4}$″, 9″, we get

$$R = \frac{5.10^2 - 4.75 \times 9^2}{6} = 19{,}2$$

Our required R is 28.8″; therefore this section is not strong enough, and we must try again. Increasing the thickness of the flange to $\frac{3}{4}$″ and that of the web to $\frac{3}{8}$″, we get the following moment-of-resistance:

$$R = \frac{5.10^3 - 4\frac{5}{8} \times (8\frac{1}{2})^2}{6} = 27.6''$$

Which is still too small, but very much closer than the first value.

43. We shall, however, proceed no further, as a calculation of this kind, in the case of I-beams, at least, is obviously of no practical value; for we might spend a long time in designing and calculating a section, only to find in the end that a beam in any way resembling that worked out is not manufactured at all; so that all our labor would prove to be wasted. In the case of "built-up" sections, such as plate or box girders, however, this method of reasoning becomes of great value, as will be seen later on.

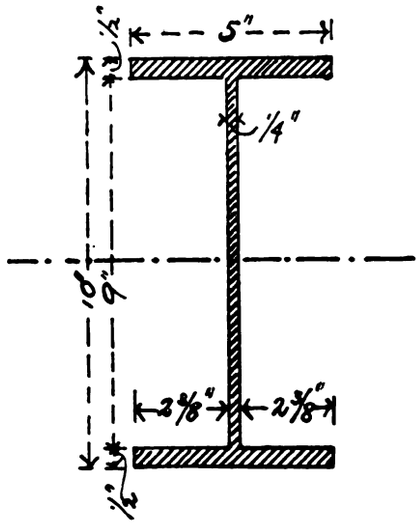


Fig. 13.

The right mode of procedure, therefore, is to look over the beams actually put on the market by the iron companies, and to select the one whose moment-of-resistance equals or comes nearest to that required.

For this purpose the several companies have published catalogues or hand-books containing tables of the "shapes" rolled by them, giving the size, weight per pound, cross-sectional area, moment-of-inertia, moment-of-resistance, of each I-beam, channel, etc.

44. Thus the "*Pocket Companion*," issued by the Carnegie Company, of Pittsburgh, gives such a table on Page 105, entitled "Properties of Standard I-beams."

The second column of this table contains the depth of the cross-section in inches; the third, its weight per foot, and the eleventh, its "Section modulus" (moment-of-resistance), "neutral axis perpendicular to web at centre." For the convenience of the reader we insert these three columns here.

TABLE III.

WEIGHT AND MOMENT-OF-RESISTANCE OF CARNEGIE STANDARD I-BEAMS.

Depth of beam in inches.	Weight in lbs. per foot.	Moment-of-resistance. Neutral axis perpendicular to web at centre.
24″	100.00	198.4
	95.00	192.5
	90.00	186.6
	85.00	180.7
	80.00	174.0
20″	75.00	126.9
	70.00	122.0
	65.00	117.0
18″	70.00	102.4
	65.00	97.9
	60.00	93.5
	55.00	88.4
15″	55.00	68.1
	50 00	64.5
	45.00	60.8
	42.00	58.9
12″	35.00	38.0
	31.50	36.0
10″	40 00	31.7
	35.00	29.3
	30.00	26.8
	25 00	24.4
9″	35.00	24.8
	30 00	22.6
	25 00	20.4
8″	21.00	18.9
	25.50	17.1
	23.00	16.1
	20.50	15.1
	18.00	14.2
7″	20.00	12.1
	17.50	11.2
	15.00	10.4
6″	17 25	8.7
	14.75	8.0
	12.25	7.3
5″	14.75	6 1
	12.25	5.4
	9.75	4.8
4″	10 50	3.6
	9.50	3.4
	8 50	3.2
	7.50	3.0
3″	7.50	1.9
	6.50	1 8
	5.50	1.7

All we need do now is to select the I-beam whose R approaches most closely to that required, which is 28.8″.

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45. We find that there is a 10″ 35-pounds I with an R of 29.3″, and a 12″ 35-pounds beam with an R of 38.0″. We might use the latter, since it would give us greater strength without increased cost, its weight being the same; but it would be but poor practice to make the beams so much stronger than is really necessary, the more so, as we have based our calculations on a very high load (200 pounds per square foot), which the floor will hardly ever be called upon to carry.

The best thing to do in a case like this is to increase the distance between beams. There will then be fewer beams, and each will have a greater load to carry, thereby requiring a greater R.

By spacing the beams 5′ 4″ on centres, as shown at 7, 8, 9, 10, Figure 11, we shall have one less in each bay, while the area carried by each will be equal to 5′ 4″ times 19′ 7″, or 103.88 square feet.

In short, we require the following R:

$$\frac{5.33 \times 19.58 \times 200 \times 19.58 \times 12}{8 \times 16{,}000} = 38.3''$$

This R is a little larger than that of the 12″ 35-pounds I, but having assumed very large loads, as has been said before, we need not hesitate to adopt this section.

46. The last equation represents the manner in which these calculations ought to be made; it combines two operations in one, and can, by means of the *slide-rule*, be solved in a twinkling. The reader, if he is as yet unfamiliar with the use of this instrument, ought to provide himself with one at the earliest opportunity, and learn to use it, as without it life becomes a burden to the engineer. The best and most practical are those of mahogany faced with celluloid. The French rules of boxwood are not as good, in spite of their being more expensive.

To make the floor complete, we still require tension-rods, girders, floor-arches, and connections, generally; these can, however, be taken up only after a preliminary discussion of the theoretical problems involved.

O. F. SEMSCH.

[To be continued.]

THE "ASPHALEIA" STAGE AT BUDA-PESTH.[1]

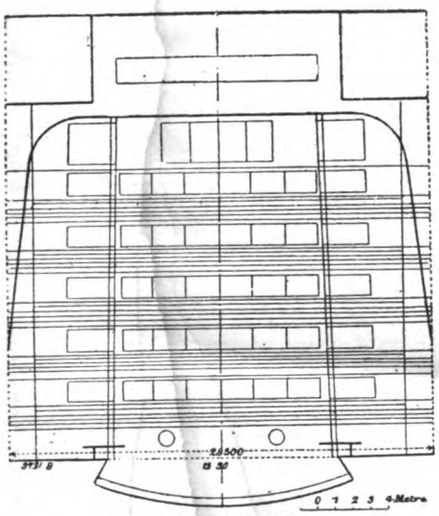


Fig. 1. Plan of Stage Floor.

WHEN speaking of the stage at the Halle Theatre, I remarked on the fact of this building taking a prominent position in the annals of theatre construction, thus making it a pioneer in the consideration of the safety of the audience and the introduction of modern methods and appliances. I also remarked on the excellent planning of the architect, Herr Seeling, and congratulated all concerned on their having taken the fearful lesson of the "Ring" Theatre to heart, with the result of a general advancement in the arrangement of playhouses and the movement known as "stage reform." Besides the theatre at Halle I mentioned the Opera-House at Buda-Pesth as a playhouse in which a stage built on the "Asphaleia" system will be found in full working order. It was, in fact, at the Buda-Pesth Opera-House that the "Asphaleia" system was first introduced, and though this house by no means compares favorably with the Halle Theatre in its planning, no doubt owing to its much earlier conception, it is certainly creditable to the promoters of the building that, after the catastrophes at Vienna, Nice and Boston, every effort was made to keep in touch with the improvements of the time. While the idea of the Halle Theatre was conceived and carried out at a time when the "Ring" Theatre catastrophe had but shortly occurred, the Opera-House at Buda-Pesth was designed as early as 1873, when a limited competition was held, and plans were invited by the Hungarian Home Secretary. The premium in this case fell to Von Ybl, who was charged with the execution of his competition design, and commenced building operations in 1875. The carcase of the building was practically complete when the "Ring" Theatre disaster occurred, in 1881, so that it has not been designed under the influence of any great catastrophe, and hence shows features of the period preceding the great reform in Continental theatre-building. Nevertheless, the Buda-Pesth Opera-House takes a very prominent place in the history of theatre-construction, and this is due mainly to the eventual introduction of appliances which are the subject of these articles, as well as other technical innovations in other parts of the building. When the Opera-House was opened in September, 1884, amid great festivities, it was the first playhouse to have a fully equipped hydraulic stage, and this date hence marks the new era of stage-mechanism.

As in the case of the Halle Theatre, the financial aspect of the Buda-Pesth enterprise may be of some interest. The original estimate for the building in 1875 was about 245,000*l.*, which figure was reduced to 183,000*l.* After the "Ring" Theatre fire, numerous alterations were made in the arrangement of the building, and the stage under consideration, which alone cost approximately 15,000*l.*, was added. The total expenditure eventually reached 266,000*l.*, inclusive of the stock of scenery, upholstery and furniture; that is to say, about 200*l.* per head of the audience, as the seating accommodation provided in this house is only about 1,250. The amount of space allotted to each spectator is exceptionally large; in fact, I know of no other instance where the seating of the audience has been carried out on so sumptuous a scale. The sum of 15,000*l.* for this stage is certainly something extraordinary from an English point-of-view, the more so if we consider that an average London theatre is often built for this price. Of course, it must be remembered, and sufficient stress can hardly be laid upon this fact, that we are dealing with playhouses in which there is a constant change of bill, making every facility for the easy working of the stage a greater boon. I do not believe that the "Asphaleia" stage could be considered otherwise than as a great luxury, if introduced into an average London playhouse where a run of 100 nights, or more, is to be expected. In such cases, the arrangement of provisional lifts or other appliances would probably suffice. It would be primarily suited to the requirements of our Covent Garden Opera, where the same play is but seldom given on two successive nights during the season. It would even be more suitable (were it not for the initial outlay) for large suburban theatres which frequently change their programme. I hold it would, however, be yet more valuable for the great variety theatres, such as the Empire and the Alhambra, which are at present but very poorly equipped, and would find the more modern appliances a boon for the quick change of the cumbersome scenery of their magnificent ballets.

While in a former article I have shown some diagrams illustrating the main lines on which the "Asphaleia" stage is designed, and in the last article have shown a series of plans and sections of a stage erected by the syndicate, with the view of explaining the system as actually adopted for practical purposes on a stage of average dimensions, the present article is supplemented by some engravings to a larger scale, showing the working-drawings from which the appliances at Buda-Pesth were constructed. The Buda-Pesth stage, I should add, ranges among the larger Continental stages. We are indebted for these drawings to one of the engineers in charge of the stage in question, M. Christofani, to whom we have frequently referred as an expert of considerable authority on the Continent. A small general plan of the Buda-Pesth example shows the divisions of the stage floor as taken from one of the printed forms on which the stage engineer sets out the scenery of his different plays to facilitate the management of the various scenes. The large plan shows the stage floor and joists, as well as the mezzanine cellar, etc., at different levels, and it will also be seen from this illustration that the part underneath the back stage is taken up by the boiler-room. One of the regular illustrated pages this week shows half-sections taken on two different lines, one section being taken near the proscenium opening and the other towards the back stage. Figures have been added, marking some of the principal dimensions.

As in the case of all "Asphaleia" stages, perhaps the principal feature at the Buda-Pesth Opera-House is the "horizon," which takes up three sides of the stage, as already described. Here the height of the "horizon," *i. e.*, the depth of the actual cloth when seen "hung," is 17 metres, the bottom hem being 2 metres above the stage floor, so as to allow the actors to pass underneath it if necessary. The total length of the "horizon" is 150 metres, while the vertical rollers stand 24 metres apart. The cloth is hung on wires and is worked by two ordinary winches placed on the second "fly" gallery. As will be seen from the section the winch is at the upper end of the vertical roller, and the "fly" gallery from which it is worked has a width of 2.20 metres. Of course the "horizon" can be wound up entirely on either of the rollers, and this is done when the back stage is used, but, as a rule, the "horizon" in an "Asphaleia" stage is considered a semi-fixture, as it is a somewhat cumbersome appliance to handle. When hung, it can, of course, be raised or lowered bodily.

Referring to the small plan of the stage floor (Fig. 1), it will be seen that a sequence of *coulissengassen* has again been provided for, with the minor sequences of "traps," "sliders," "chariot slits," etc. There are five *coulissengassen* in the ordinary sense of the term, besides the spaces between the first *coulissengasse* and the proscenium opening, and between the last *coulissengasse* and the back wall, the former of which spaces has two "star-traps," as in the case of the Halle Theatre, whilst the last has the same series of broad "traps" as the ordinary *coulissengasse*. In the large diagram showing plans at various levels it will again be easily seen, as in the Halle example, on what a few points the stage floor really rests, and also how the large "traps" running across the stage are divided into six sections, to each two of which there is an hydraulic ram. It will be seen how the central one of each set of three rams supports the "trap" proper, while the two rams on either side can be made to work the large "slabs" containing openings for traps, sliders, etc., bodily. A reference to Article XVII, of this series

[1] One of a series of articles by Mr. E. O. Sachs on "Modern Theatre Stages," now publishing in *Engineering*.

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will assist the explanation of the Buda-Pesth stage, as the several perspective views therein portrayed will show clearly how the large rams can be worked, and how again the smaller rams can be utilized to work minor sections. It would almost suffice to say that the combination of the set of three rams, with its minor rams to each trap, divided into six sections, gives innumerable possibilities to the scenic artist. Of course, the whole area of all the *coulissengassen* can be sunk or raised bodily together, *i. e.*, a very large part of the stage floor can be moved bodily. Each *coulissengasse*, besides being raised or lowered vertically, can be so moved that the "slab" slopes; in fact, a see-saw movement can be obtained for either one *coulissengasse* or all five together.

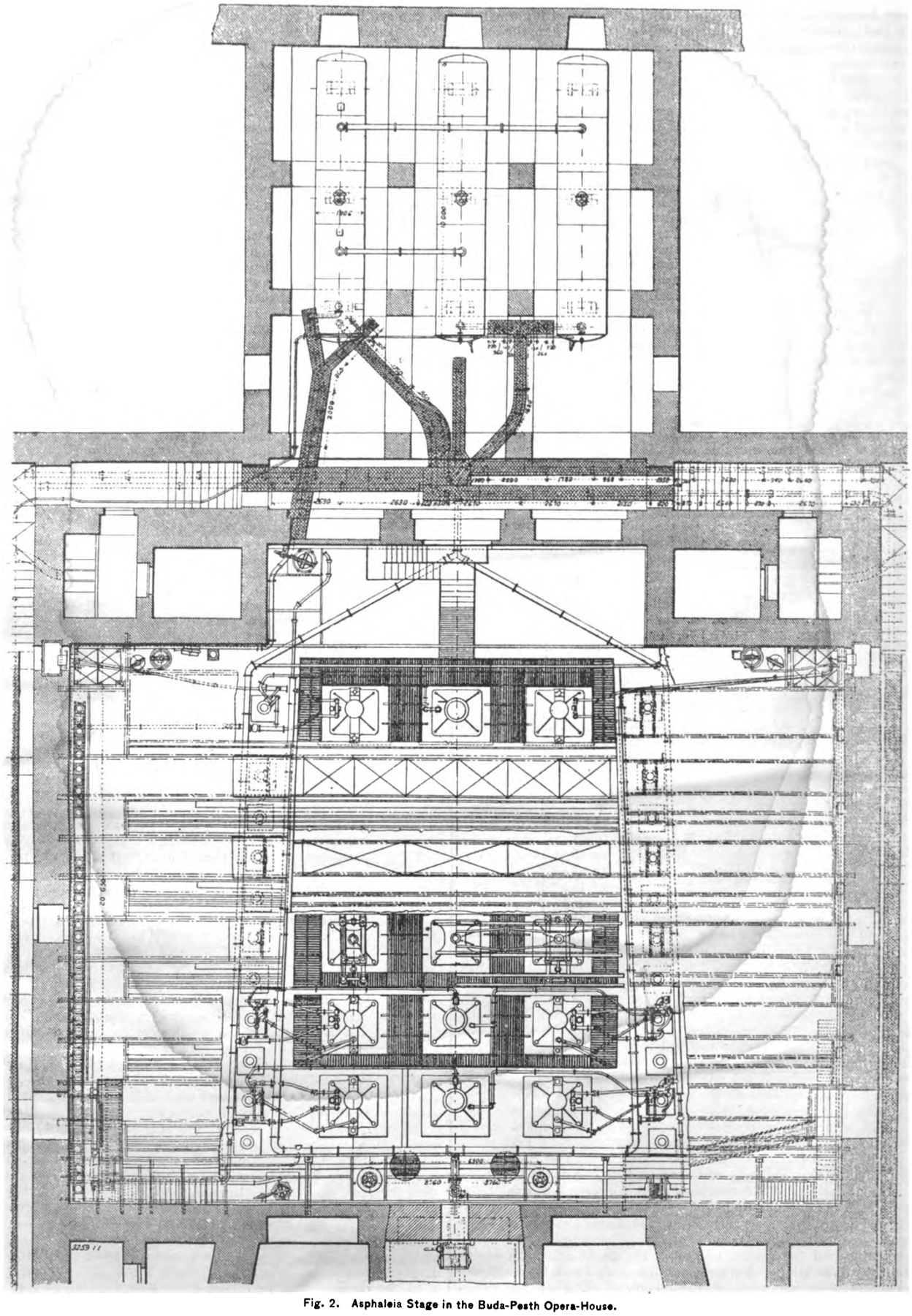


Fig. 2. Asphaleia Stage in the Buda-Pesth Opera-House.

It would lead too far to describe the installation of the hydraulic power for the rams or the other mechanical appliances, but the arrangement of motive power practically comprises large storage-tanks with a capacity of 75,000 litres in the roof of the building, fed from

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a large well, the pump being worked by a 12-horse-power gas-engine. The pressure in the installation is seven atmospheres, and I may add that the same installation also feeds a large number of hydrants for fire-extinguishing purposes. There is a second gas-engine in reserve on the premises in case of a failure, or an extra supply of water being required on an outbreak of fire.

I have already stated that there are five *coulissengassen* with a space at front and back, and that the latter has a large "trap" as the "under-machinery" of an hydraulic stage, to my mind in this instance it takes a position of equal importance in the system. The whole of the top machinery is practically supported by two main lattice girders running from front to back of the stage, parallel to the side walls, and only about 2.3 metres away from the latter. There are five secondary lattice girders resting on these two, and running parallel to the proscenium curtain. The two sections shown amongst our illustrations distinctly show the arrangement. Why the five

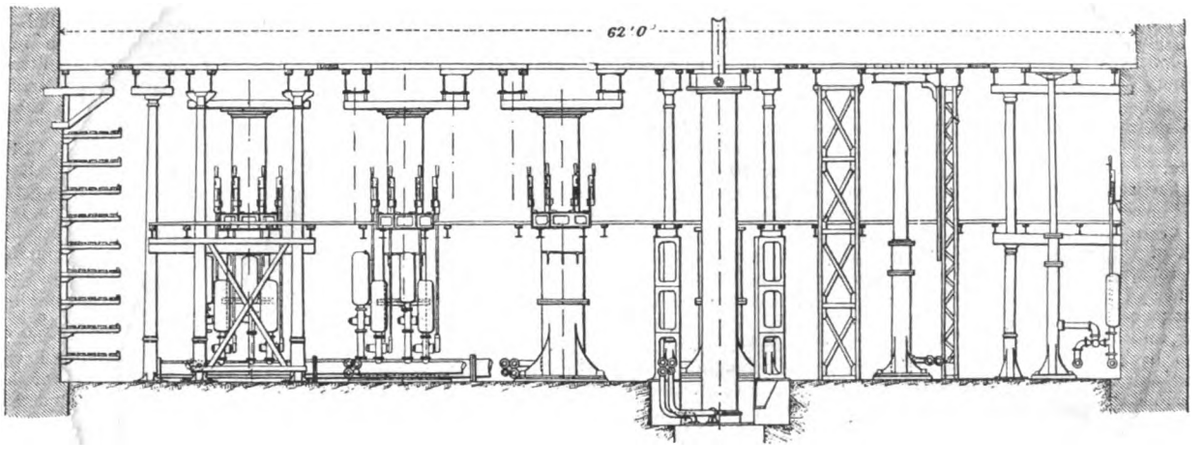


Fig. 3. Asphaleia Stage in the Chicago Auditorium.

like the ordinary *coulissengassen*. The total number of principal rams is, hence, 18, and these are fed by two services from the reservoirs above mentioned. The diameter of the rams is 650 millimetres. The width of the main "slabs," *i. e.*, the depth of the ordinary *coulissengasse*, which of course includes the width of the "trap" proper, sliders, slits and framing, is 3 metres.

The width of each "slab" is about 12 metres. The dimensions of the opening for the "trap" proper in each *coulissengasse* is 11 metres by 1.3 metres, while the "slider slits" are 0.20 metre wide. There are five iron joists to each "slab," fitted parallel to the proscenium curtain, and these are supported by the outer rams, as already mentioned. Each "slab" can be raised 4 metres above stage-floor level, or lowered 2.3 metres below it. The bearings of the five joists of each "slab" are movable, so that the "slope" of the slab would not interfere with the vertical position of the rams proper. In respect to the main trap of each slab, which, as already stated, is divided into six sections, I would add that the two central sections can in each case be raised 6 metres above stage-floor level.

I have referred to the difficulty of tying the main joists of a wooden stage, and have mentioned the various makeshifts adopted, such as iron hooks, etc. In the "Asphaleia" stage no attempt whatever is made to tie the various parallel sections of the stage together. Each *coulissengasse* works individually, and stands, if I may say so, on its own legs, and there are no ties from front to back of the "under-machinery." No doubt this arrangement, if perfect, would be a boon to those in charge of a stage, but, if we are rightly informed, the absence of "ties" in the "Asphaleia" system girders do not rest on the side walls direct I am unable to explain, for these are over one metre thick at the top, and should be able to carry a considerable weight. The two principal girders appear quite unnecessary, unless there was a distinct purpose in transferring the weight of the "top machinery" to the front and back walls. It is, however, plain, as already stated, that the two principal girders practically support the whole of the upper appliances, and these in the first place comprise a system of 416 pulleys of 104 "battens" with 104 sets of roping or "wires." These 104 sets are worked by 36 small hydraulic rams placed on the left wall when looking "up" the stage. Pulleys, sets of roping, and the hydraulic rams are shown on our engravings. The battens, it will be seen, are in each case fastened at three points only about 6 metres apart. There is one hydraulic ram to every three battens. The roping is wire cable of 7 millimetres diameter. The whole of the hydraulic rams are worked from a set of levers on two switch-boards in the front part of the stage, where there is a small raised gallery fitted for the mechanic.

In respect to the working of the "horizon" referred to above, I would only add that the canvas is hung from 13 points running over 39 rollers, the roping or wires being gathered together in such a manner that the appliance can either be bodily raised or lowered by means of an hydraulic ram. The whole "horizon" can be taken "up" out of sight, as the dimensions of the design allow for raising the bottom hem of the canvas to 8 metres above the stage-floor level.

Of minor appliances the "flying gear," which is shown on the

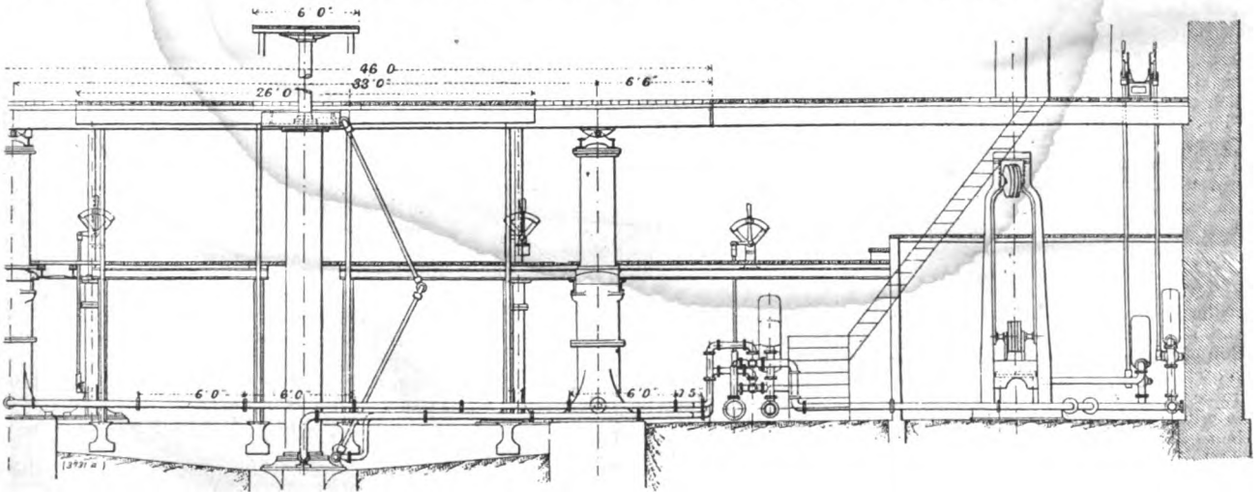


Fig. 4. Asphaleia Stage in the Chicago Auditorium.

is by no means as satisfactory as the promoters would have it. Each slab or *coulissengasse*, when in its usual position, forming part of the stage floor proper, has a remarkable tendency for vibration, so that the makeshifts of wood struts and cords have frequently been employed where a regular movement, such as a dance or march, etc., takes place. Protracted regular movements are almost impossible.

In respect to the "top machinery" of the Buda-Pesth example, though perhaps not generally acknowledged to be of equal interest sections, is, perhaps, considered the most interesting. It allows the clever imitation of flying movements in curved sweeps.

It is not my intention to describe technical details. There is but little that is complicated even in advanced stage-mechanism, the principles of the various designs being the main points at issue, and not the methods of execution. Given certain requirements and the basis on which they are to be fulfilled, the engineer will, as a rule, find no great difficulty in solving his problem if he is versed in

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stage-mechanism. The "programme" for the design will, however, be hard to determine, not only for any one class of playhouses, but more particularly for each individual example, owing to the very different purposes stages are put to, not only on the Continent, but also in this country. It would, for instance, not be easy to find another theatre in which exactly similar requirements would be made, as in the case of the Opera-House at Buda-Pesth under consideration.

In the case of the "Asphaleia" at Halle I quoted at some length the opinions of Herr Richter, the engineer who had had considerable experience in working the appliances of the German example. I should now also quote the opinions of the engineer in charge of the "Asphaleia" stage at Buda-Pesth, were it not for the fact that on examining my notes, I find there is a wonderful similarity in the criticisms of this expert with those of Herr Rudolf, the engineer of the Vienna Opera-House, whose comments I also recorded in a former article. Reference to Herr Rudolf's remarks will suffice to explain the views of the Buda-Pesth engineer, M. Christofani, whose opinion in this instance carries even greater weight than that of his Vienna *confrère*, owing to its being founded on practical experience, due to being in charge of the appliances under consideration. There is one point, however, on which M. Christofani's views are distinctly severer than Herr Rudolf's, and this refers to the acoustic disadvantages of the "Asphaleia" stage. He states that the resonance of the Buda-Pesth stage is most disagreeable, and that he can only prevent his stage from being useless by hanging a large number of extra cloths to his "gridiron" to make the rendering of a play possible. These extra cloths are a source of danger in the case of an outbreak of fire, and he recognizes them as such. We here have an instance of one of the principal advantages of the "Asphaleia" stage as described in the syndicate's prospectus as being entirely annulled, for we find exactly the opposite to the much-advertised statement that there need always only be a minimum of inflammable material at the "back of the house." There is, no doubt, less wood in the "Asphaleia" stage, but, on the other hand, more canvas, and the noxious fumes of burning canvas are even more dangerous than those from burning timber.

It is not my intention to lay special stress on the various defects of the system under consideration, for, as I have already remarked, the stage at Buda-Pesth and the "Asphaleia" system generally were the pioneers of the "Stage Reform" movement, and we are indebted to the enterprise of the syndicate for the great progress made of late in stage-construction. It is by no means remarkable that the first examples of a new system should show considerable defects. Nevertheless, where promoters use such high-flown language in the laudation of their wares, and promise so much that their appliances are unable to fulfil, it is essential to point out faults in a more decided manner than would otherwise be the case. The prospectus of the syndicate, which was given at some considerable length in a former article, produces a too highly-colored view of the advantages of the "Asphaleia" system. The following recapitulation of defects should be read in connection with it.

In the first place, the great risk of fire, so evident on all stages, is only partially lessened, for while the risk of conflagration is minimized so far as the catching alight of structural parts is concerned, the necessary greater storage of canvas on the top machinery is a source of danger. The great heat of a large quantity of burning canvas would, on the one hand, involve the speedy collapse of the girders and main structural parts of the design, whilst on the other hand, as already said, the noxious gases are particularly disastrous in their effect on the audience. In the second place, the acoustic properties of an "Asphaleia" stage are far from satisfactory, even if the makeshift of canvas storage, just referred to, is applied. Thirdly, the division of the stage floor does not allow the scenic artist sufficient scope to fulfil the requirements of a well-mounted play. Considerable use has to be made of the old makeshift of movable platforms, etc. A fourth defect comprises the excessive centralization of the levers for working the appliances. The fact that the whole "top machinery" is worked from one point appears very satisfactory to the layman, but in reality, full control of the "cloths" becomes almost impossible, and the risk of accident is increased. Another serious fault consists in the want of elasticity in the construction of the traps as far as the risk of accident in the raising and lowering of artists is concerned. The mechanical appliances do not allow an accident to be easily averted, as in the case of the old wooden "trap." The want of rigidity of a stage floor supported by a few hydraulic rams becomes a serious defect directly plays are rendered which require large crowds on the stage, marching, dancing, or other regular movements. The last, though by no means least, important disadvantage of the "Asphaleia" stage to be here recorded is the excessive initial outlay, and the fact that there is by no means that saving of working-expenses so boldly advertised, whilst the depreciation of the value of the appliances is very rapid. Of course, I have only touched on the main features of the system for these criticisms, and not on any points relating to the actual construction.

Though I do not propose giving particulars of other examples carried out by the "Asphaleia" syndicate, I do not wish to omit mentioning that a stage has been set up according to their system at the Auditorium Building, in Chicago, which is well known to be one of the most interesting blocks in the United States. Here the movable part of the stage has a depth of 18.8 metres and a width of 14 metres, the depth being divided into six *coulissengassen*. Four of the *coulissengassen* can be moved bodily, whilst the other two can only be raised and lowered in parts, and it appears that the levers in this case are all placed in the first "mezzanine." The various sections can be raised as much as from 12 feet to 15 feet above the stage-floor level. The reservoir which supplies the necessary power for the hydraulic rams is in the well known tower 200 feet above street level. I have added two diagrams (Figs. 3 and 4), to explain the principal features of the under-machinery. They show that the design is very similar to that of the example already given. It would lead too far to go into detail in respect to further examples of the same type, whatever small variations each may show. The Buda-Pesth and Halle examples are not only typical, but also the best specimens of the "Asphaleia" system under consideration.

I must now pass on to designs evolved from or based on the "Asphaleia" system. Stages thus executed are frequently known as "Bastard Asphaleian," but I shall prefer to not use this name, for, among other reasons, comparison of dates and facts have, for instance, shown me that much that is attributed to being directly evolved from the "Asphaleia" system has been designed quite independently of work done by the syndicate, and has even been designed at an earlier date than the formation of that company. The stage of the Hofburg Theatre at Vienna must have been planned (if not partly constructed) considerably earlier than the important date in September, 1884, when the appliances of the first "Asphaleia" stage were set in motion at Buda-Pesth Opera-house.

ELECTRIC RULES.

THE architects of the country are familiar with the National Code of Rules for Electrical Construction and Operation principally through their publication and dissemination by the National Board of Fire Underwriters, and have often been perplexed and annoyed by the want of uniformity between them and municipal and other codes, and have found them, as was natural, illogically arranged and containing requirements which belonged to the earliest stages of the use of electricity, which had become obsolete with the advance of the science and growth of invention.

To remedy this condition an invitation was sent out, about a year ago, for the appointment of delegates to a "Joint Conference of Electrical Insurance and Allied Interests looking toward the adoption, promulgation and enforcement of uniform rules of electrical construction and operation." The first meeting of this Conference was held March 18 and 19 of this year at the headquarters of the American Society of Mechanical Engineers in New York, at which a large amount of work was done, and after organizing as the "National Conference on Standard Electrical Rules," with headquarters at 12 West Thirty-first Street, New York, it was decided to place the work of draughting the final Code in the hands of a Committee of eight, including the President (*ex-officio*). This Committee consisted of the following gentlemen:

Professor Francis B. Crocker, Chairman, Delegate American Institute of Electrical Engineers; Frank R. Ford, Secretary, Delegate American Street Railroad Association; William Brophy, Delegate National Electric Light Association; William H. Merrill, Jr., Delegate National Board of Fire Underwriters; E. A. Fitzgerald, Delegate Underwriters' National Electric Association; Alfred Stone, Delegate American Institute of Architects; E. V. French, Delegate American Factory Mutual Insurance Companies; W. J. Hammer, (*ex-officio*).

This Committee met in New York in October and spent two days upon the preparation of the Code, and assigned to each member of the Committee a certain portion of the rules for further consideration, with instructions to each to codify the portion referred to him and to send the same to all the other members for criticism and suggestion.

These rules were then taken up at a meeting of the National Board of Fire Underwriters, held in New York from Monday, December 7th, to Thursday, December 10th, inclusive, to which had been invited a number of electrical engineers and experts. The rules were then very carefully considered and reviewed, and elicited much discussion and not a little criticism, resulting finally in the adoption of nearly all of the suggestions of the Committee of the Joint Conference, and a plan for their rearrangement.

They were then considered by a Committee of Underwriters, the electrical experts and the entire Committee of the Joint Conference in New York on Friday, December 11th, and received the unanimous support of all present.

These rules, as finally adopted, will be printed as a National Code, and will be issued by the National Board of Fire Underwriters and other bodies to give information on electrical construction and operation, and the several societies which have sent delegates to the Conference will be asked to endorse or adopt them.

The work thus accomplished by the Conference with the co-operation of the National Board of Fire Underwriters will, it is expected, be of great assistance to architects, who will now have a positive and uniform standard of rules to which they can confidently specify that all work shall conform, resting assured that they will, if lived up to, result in satisfactory, up-to-date work, fulfilling the requirements of safe construction and the best electrical practice.

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BOOKS AND PAPERS

THE man who asserts that the book he has written was intended "to show that the history of architecture is a study of absorbing interest" has made use of a most dangerous adjective, since it is sure to challenge the critic's attention and turn his attention somewhat to the discovering whether or no the book before him has really absorbed him. Ordinarily speaking, writers on architectural history generally succeed in being prosy in style, for it is almost inevitable that a writer who undertakes to describe the genesis and development of schools and styles, one after another, should fall into a somewhat see-saw use of words and phrases as he approaches and then leaves behind him the correlative *indicia* of succeeding architectural developments. This is especially likely to be the case where the writer attacks his subject analytically from within, deducing his causes from the resultant facts, while it is less likely to be the case when he approaches his field and works it synthetically, establishing first his causes, after an exposition of the contemporaneous manners and customs, and showing how certain requirements of the civilization of the day were satisfied by the architects and artisans charged with the task.

We believe it will be conceded that the writer who adopts the second method rather than the first more easily achieves such success as lies in producing so living a picture that its mere depiction holds the reader's attention, since, feeling for the time being a contemporary with the workers, as he has been made to feel their needs, their manners, their aspirations, he readily understands their difficulties and sympathizes heartily with their successes, or laments as sincerely over their failures.

Those who have had the pleasure of hearing Mr. Sturgis talk or lecture know with what breeziness of manner and affluence of words he can hold his listeners' attention, and will feel, as we did, that if any one can write an "absorbing" history of architecture, he is as likely to be that man as any other in this country. In a very considerable degree he has succeeded in doing this, and if one cannot fairly say that he has difficulty in laying the book aside because of an interruption, he can, at least, say truthfully that the book can be read without a sense of weariness, in spite of the fact that the subject is approached from the inside rather than from without.

In a very marked degree is the book [1] the production of an architect, as distinguished from a book treating the same subject as it might have been presented by an artist, an archæologist, or a mere *littérateur*. With singular and commendable tenacity of purpose Mr. Sturgis has never once lost sight of the architect's true interest and purpose: his creations must be built; must be built with the ordinary building materials, and must be built to stand and endure the assaults of time and weather, and withstand internal and external strains and stresses. He approaches his subject in the spirit of the constructor — a Gothic, and therefore a scientific, constructor at that — and in his examination refers every accomplishment to its proper structural basis, so that the reader feels the assurance that every link in the chain of development has been properly tested before it is allowed to bear the weight of the other links that are going shortly to depend upon it.

As the book is devoted entirely to a consideration of European architecture, the reader is spared the usual introductory chapters, that describe with great obscureness the art as it was practised in various uninteresting — because obsolete and non-modern — countries of Asia and Africa. The architecture of the Greeks and of the Roman Empire is covered with a sort of hop-skip-and-a-jump movement in about one hundred pages. In this portion of the book the writer's style is so simple and so lucid that the reader involuntarily asks himself whether it is a school-book for children or for the most superficial of amateurs that he has before his eyes. In this part of the book occurs a stylistic peculiarity that calls to mind the author's eagerness when speaking. Instead of using, as illustrations to point his morals, the buildings that are generally mentioned — so often that it must be quite common to believe that they alone illustrate the points under discussion — Mr. Sturgis adopts the refreshing innovation of using the less well-known buildings to substantiate his assertion. This course might be held a bit pedantic were it not for the breathless eagerness with which he piles Pelion on Ossa. He seems to be saying: "Yes, this building exhibits the point, and then there is another one here and another one there,— and hold on a minute, don't interrupt, there's another yonder and still another over beyond." It may have the air of pedantry, but is really good-natured eagerness to share with others the results of much reading and acute examination. But what is pedantry, and of a form which is to us extremely offensive, is his yielding to the modern fad that is seeking to introduce into English literature the Græcizing of geographical and biographical names that for centuries have stood in our literature in their Latinized forms. It is discomfiting enough to have a writer indulge this fad, but it only excites one's desire to ridicule to find how seldom can a votary of this absurdity write a dozen pages and be thoroughly consistent. Mr. Sturgis has been quite as successful as others, but no more. He sometimes writes "Samothrace" and sometimes "Samothraki," sometimes it is "Xanthus" and again "Xanthos." The same lack of persistency in adhering to a definite form of nomenclature appears later in the book, where a reference to "St. Paul's outside the walls" (lower-case o and w) is followed not long after by a mention of "S. Lorenzo Fuori le Mura" (upper-case F and M). It is hard to be consistent in intention, and proof-reading is not an easy art, but the large type and double-leaded lines used in this book make these trivial slips rather conspicuous.

While the estimable qualities of Greek and Roman architecture are clearly and logically explained, and while the reader has as yet no inkling that the writer's personal interest centres rather on the Gothic period, he becomes aware of certain omissions of things that might be expected to have a place in a book that makes its appearance in this current year. In some sense, the writer's own words offer an explanation of these *lacunæ*, where he says that "Roman archæology, in the sense of the study of the whole Empire, and not of the city and its surroundings alone, is still in its infancy, but it is probable that if the civic buildings of the third and fourth centuries, from Britain and Mauritania to the Euphrates, were compared and their dates ascertained by inscriptions and by the comparison of one with another, it would be recognized that a late Roman imperial style was in full process of formation." Realizing that there was, perhaps, a general lack of information as to the imperial work done in the outlying countries, Mr. Sturgis has evidently sought to afford a remedy for this state of ignorance by drawing an unusual number of his cited examples from the outskirts of the Roman Empire. In so doing, he has somewhat lost to sight the archæological discoveries that have been made in Rome itself. Thus we find in the description of the Pantheon no mention of M. Chedanne's interesting discoveries as to the method actually employed in building the great dome, or of the no-less-clever deductions by which he establishes the fact that the present portico is but the abbreviation of a former octostylar one. Nor in the description of the Theatre of Marcellus is any mention made of the measurements by one of the recent American travelling-scholars which establish quite a different proportion for the orders used from that which has usually been assumed for them. To be sure, these slight omissions do not establish either ignorance or carelessness; they do but prove that the study of archæology, not only in Rome, but elsewhere, is in its infancy, but growing with a vigorous development which produces continued surprises and traps for unfortunate writers who are handicapped by the length of time which elapses between the writing of a statement and its public appearance in print.

In innumerable places the writer has very happily expressed himself, and in so doing has exhibited the purely architectural — that is, structurally speaking — bent of his own mind. As for instance, when he writes: "It is a curious result of this [the habit of building first and ornamenting afterwards] that Roman architecture has prevailed over the European world ever since 1550 (in Italy since 1450), and that the architects generally have liked nothing so much; while the archæologists of art, being students of the refined and expressional in sculpture, and caring little for building and for the stately and the vast, give all their attention to Grecian remains. Less is known of Roman than of Greek architecture, although the Roman remains are more abundant, and are scattered over the Mediterranean world, and even as far north as England and North Germany." This expansion was due to, and ceased with, what he styles the "irresistible supremacy of the imperial officials."

Writing his work in the second method (that is, from the outside), examining the causes and then stating the results, many a writer at this point would have introduced a very interesting historical chapter, but with praiseworthy singleness of purpose our author leaves all such sociological changes to be inferred and accepts downfall and dissolution on the evidence of their structural remains, and mourns the passing of a great race of builders, and of artists, so far as the workers of the Eastern Empire are concerned, only by declaring that it is "a strange and not perfectly explained process of decay, this of the artistic power of a whole world of men."

While he evidently has great respect for the achievement of the Romans, it is the work and logical reasoning of mediæval craftsmen that most command our writer's regard and commendation, and to them and their work he has devoted the greater portion of his space, and has treated the rational development of Gothic styles with admirable simplicity and perspicuity. From the outset he makes it clear that those who developed Gothic styles worked as builders and not as ornamentalist artists. As he says: "To thoroughly enjoy the architecture of a French cathedral, one must have the natural or acquired sense of organism. The structure before him must appeal to his sense of what is perfectly understood and well thought out as a system of building, or he will find it too complex." Here, as elsewhere, like a good teacher of figure-drawing, he insists on his pupils' having a full working knowledge of structural anatomy. He goes on to say that "Italian buildings, with their unconsidered, careless structure, as of a style only half understood and not thought important to study out; with their broad sun-lit surfaces of plain wall and their beautiful details, set here and there as if by accident, will please such an art student better than the perfections of Bourges Cathedral or the Sainte Chapelle."

Of this Italian work he speaks elsewhere in the same fair-minded, but seemingly rather slighting way, saying that "the Italians have

[1] "*European Architecture.*" An Historical Study by Russell Sturgis, A. M., Ph. D., F. A. I. A., President of the Fine Arts Federation of New York; Past President of the Architectural League of New York; Vice-President of the National Sculpture Society; Honorary Member of the Mural Painters, etc. New York: The Macmillan Company, 1896. Price, in cloth, $4.00.

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never been an architectural people in the highest sense. No great style of architecture has originated in Italy; nothing that can compare with the Greek or the Byzantine, early Egyptian or Gothic. An artistic race is not necessarily great in architecture, nor, on the other hand, are good builders necessarily good architects." This last statement we commend heartily to the attention of numberless American practitioners.

Yet, while the structural qualities command his chief regard, Mr. Sturgis admits that architectural results based on other than structural requirements are often deserving of admiration, for he says: "It appears that the architecture of construction and organization, of reason and logic, of perfect proportion and harmony of part with part, is but one, and that there is also the architecture of huge masses, hardly organized, piled up without much reference to the significance of their parts, roofs and walls thought satisfactory if they give shelter, and then adorned richly with what the arts of color and of form can give after the construction is finished."

Taken all in all, the book is an enjoyable one to read, and if clearness and simplicity of statement, an agreeable style and a capacity for introducing philosophical reflections that have something of the ring of real philosophy about them, if such things go to constitute a book that has proved that the "history of architecture is a study of absorbing interest," then this writer may fairly assert that he has proved his point.

The book is somewhat weak in the matter of illustrations, for though there are more than two hundred and fifty text-cuts and though they properly illuminate the writer's several statements they all — with the exception of those borrowed from Viollet-le-Duc and other well-known sources — have the appearance of being the work of amateur performers, or of draughtsmen whose sense of line has become deteriorated through working over photographic salt-prints. Still, such as they are, they are useful and the credit of the several draughtsmen who have been associated in the work has been carefully preserved in a most elaborate index of illustrations. The book also has a fair index and an admirable glossary of terms — terms that are actually used by the writer and of which it is well for the reader to have a precise definition close by his hand.

BOOKS RECEIVED.

"*The Story of Architecture*": An Outline of the Styles in all Countries. By Charles Thompson Mathews, M. A., F. A. I. A., author of "*The Renaissance under the Valois.*" New York: D. Appleton & Co. 1896.

"*The Castles of England*": Their Story and Structure. By Sir James D. Mackenzie, Baronet of Scotwell and Tarbat. With forty plates, one hundred and fifty-eight text illustrations and seventy plans. 2 vols. 4to. New York: The Macmillan Co. 1896. Price, $25.

"*Berlin und seine Bauten.*" Bearbeitet und herausgegeben vom Architekten-Verein zu Berlin und der Vereinigung Berliner Architekten. With 2150 text-cuts, 18 gelantine plates and 5 maps. 2 vols. 4to. Berlin: Wilhelm Ernst & Sohn. 1896. Price, bound, 60 marks plus charges.

"*Etude des Ornaments.*" Dauphins, Écailles, Bucranes, Grecques, Guirlandes et Flots grecs. Par Jules Passepont, Professeur à l'École régionale des Arts et à l'École pratique d' Industrie de Sainte-Etienne. Illustrated with 651 text-cuts. Bibliothèque des Arts décoratifs, publiée sous la Direction de M. Victor Champier. Paris: Libraire J Rouam et Cie. 1896. Price, unbound, 10 francs plus charges.

"*Theatre Fires and Panics*": Their Causes and Prevention. By William Paul Gerhard, C. E., Consulting Engineer for Sanitary Works. New York: John Wiley & Sons. 1896.

"*A Text-book of the History of Sculpture.*" By Allan Marquand, Ph. D., L. H. D. and Arthur L. Frothingham, Jr., Ph. D., Professor of Archæology and the History of Art in Princeton University, being No. III of the "*College Histories of Art*," edited by J. C. Van Dyke, L. H. D. New York: Longmans, Green & Co. 1896.

"*The National Electrical Code*": An Analysis and Explanation of the Underwriter's Code intelligible to non-experts. By Pierce & Richardson, Electrical Engineers. Chicago: Charles A. Hewitt. 16mo. Price, in flexible leather, $2.

SOCIETIES

NEW JERSEY SOCIETY OF ARCHITECTS.

A MEETING of the New Jersey Society of Architects was held at 842 Broad Street, Newark, Friday, December 11th, President L. H. Broome in chair, George W. von Arx, Secretary.

The Constitution was amended so as to provide two vice-presidents instead of one, and five trustees instead of three.

The annual election of officers resulted in the following choice: *President*, —— Albert, Hoboken, N. J.; *First Vice-President*, Robert C. Dixon, Union Hill, N. J.; *Second Vice-President*, Paul Botticher, Newark, N. J.; *Secretary* and *Treasurer*, George W. von Arx, Jersey City, N. J.; *Trustees*, three-year terms, Charles P. Baldwin, Newark, N. J.; Thomas Cressey, Newark, N. J.; Benjamin F. Hurd, Newark, N. J.; F. F. Martinez, Jr., Bayonne, N. J.; *Hold-over*, Charles F. Zachau, Jersey City, N. J. The aforesaid officers constitute the Board of Governors. Next Board of Governors' meeting, December 22d, at above rooms.

George W. von Arx, *Secretary.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

REAR VIEW OF ALEXANDER HALL, FOR PRINCETON UNIVERSITY, PRINCETON, N. J. MR. W. A. POTTER, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print, issued with the International and Imperial Editions only.]

THIS building, which is intended for the holding of Commemoration exercises, is the gift to the college of Mrs. Charles B. Alexander, of New York City, and was opened for use in June, 1894, after an expenditure of $250,000. The auditorium within will seat 1,500.

THE ASPHALEIA STAGE IN THE OPERA-HOUSE, BUDA-PESTH, HUNGARY.

FOR a description of this stage, which is here reproduced from the pages of *Engineering*, see article elsewhere in this issue.

LONGWOOD AVE. BRIDGE FOR THE PARK COMMISSIONERS OF THE TOWN OF BROOKLINE AND THE CITY OF BOSTON, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

CHURCHES ON THE ISLE OF WIGHT AT SHOREWELL, FRESHWATER, AND BRIGHTSTONE. SKETCHED BY MR. A. B. BIBB, ARCHITECT.

PULPIT IN ST. PETER'S, SHOREWELL, ISLE OF WIGHT. SKETCHED BY MR. A. B. BIBB, ARCHITECT.

THE PETIT TRIANON, VERSAILLES, FRANCE. JACQUES-ANGE GABRIEL ARCHITECT.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXVII: THE TERRACE: ST. GERMAIN-EN-LAYE, FRANCE.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXVIII: AVENUE DES LOGES: ST. GERMAIN-EN-LAYE, FRANCE.

THE PROPOSED NEW MARKET BUILDING, ST. LOUIS, MO. MR. LOUIS MULLGARDT, ARCHITECT. — THE COURT OF HONOR, WORLD'S COLUMBIAN EXHIBITION, CHICAGO, ILL.

[Additional Illustrations in the International Edition.]

ENTRANCE PORCH OF ALEXANDER HALL, PRINCETON UNIVERSITY, PRINCETON, N. J. MR. W. A. POTTER, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print.]

GABLE END OF SAME BUILDING, SHOWING SCULPTURES BY MR. J. MASSEY RHIND, SCULPTOR, NEW YORK, N. Y.

[Gelatine Print.]

THIS interesting and very unusual piece of decorative sculpture shows in life-size figures an allegorical treatment of those intellectual processes with which a great institution of learning naturally has to do. In the spandrels below the great rose-window are shown figures typifying "Study" and "Play." In the great horizontal supporting band is the seated figure of "Learning," supported on the one hand by the sciences — Language, Theology, Law, History, Philosophy and Ethics, and on the other by the arts — Architecture, Sculpture, Painting, Poetry, Music and Astronomy. The vertical series of panels upon the right typify Religion, while those upon the left represent Law. The sculptor's work was based upon the architect's sketches and suggestions.

DESIGN FOR CASING CARFAX TOWER, OXFORD, ENG. MR. H. T. HARE, ARCHITECT.

BY a special Act of Parliament passed in 1890, the Oxford Corporation was empowered, on the vacation of the living of St. Martin, Carfax, to acquire the church for a much needed street improvement, the parish being united with that of All Saints. The Act also provided that the tower should be retained and maintained as marking an historic site. On the acceptance by the Vicar of another living

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last year, the Act came into operation, and the Corporation purchased the adjoining properties in order that the whole might be dealt with in a comprehensive scheme.

The church, which was rebuilt in 1820, was an uninteresting example of the Gothic architecture of that period, and has now been removed, together with the adjoining properties, which latter are now being rebuilt to new frontage lines. The only portion of the scheme remaining to be dealt with is the tower. The lower part of this, up to the belfry stage, has always been buried in the church, and is constructed of ancient rubble masonry of the roughest description, plastered over, and, therefore, concealed from view, and devoid of any architectural features. The belfry stage was remodelled some ten or twelve years ago, and, as the view shows, is of no interest architecturally. Having regard to the facts that the tower will now occupy a most important and conspicuous position at the western termination of the High-street, that the lower part has never been intended to be seen, and contains no features worth preserving, and that the upper story is modern in design and construction, I have considered it justifiable to propose the entire remodelling of the design in order to make it worthy of its position. This was proposed to be effected by casing the lower portion, and reconstructing the belfry stage. It is evident that some such repair must be done to the lower part to ensure its stability, and casing appears to be the only feasible method of dealing with it. These proposals were accepted by the Committee appointed, and recommended to the Council, who have, however, rejected the scheme by a large majority, and referred the matter back to the Committee with instructions to submit a scheme for the mere repair of the tower as it stands. This the Committee have declined to do, and have placed their resignation in the hands of the Council. For the present the question rests in this position, and there is every prospect that a fine opportunity will be lost through a mistaken antiquarianism. The accompanying illustration is copied from the *Builder*.

TOMB OF THE PELSER-BERENSBERG FAMILY, LEMIERS, HOLLAND. PROF. L. SHUPMANN, ARCHITECT, AIX-LA-CHAPELLE.

THIS plate is copied from *Architektonische Rundschau*.

TWO COMPETITIVE DESIGNS FOR A MONUMENT AT LYONS, FRANCE, TO PRESIDENT CARNOT. M. LEFEBVRE AND MM. HUGUET & DELORME, ARCHITECTS.

THESE illustrations are copied from *La Construction Moderne*.

"INDUSTRY": BY HUGO VOGEL.

THIS decoration is to be found in the Bank für Handel und Industrie, on the Schinkelplatz, Berlin, of which the architects were Ende & Böckmann. The illustration is copied from *Moderne Kunst*.

NEW PREMISES, LONDON & COUNTY BANK, WIMBLEDON, ENG. MESSRS. CHESTON & PERKIN, ARCHITECTS.

NEW SENIOR SCHOOL, WEST CALDER, N. B. MR. J. G. FAIRLEY, ARCHITECT.

DUNWICH BENEATH THE WAVES.

THERE are few sections of the British coast-line which have been subjected to greater change and devastation than that of East Anglia, lying between Aldeburg and Lynn. Century after century, the sea has slowly but surely gained its victories over the land, and to-day carries on the siege with unabating energy. The East Anglian shores offer but a frail barrier against the swinging North Sea rollers, often but a narrow ridge of marram-grown hillocks of drifted sand lies between the fretting beach surf and low-lying marsh land, stretching inland for many miles. Already the ocean bed off Norfolk and Suffolk is strewn with the ruins of villages, towns and even cities that once were conspicuous landmarks of the coast, and fitted out many ships to fight their country's battles in England's early wars.

Between Southwold and Aldeburg on the Suffolk coast, in an out-of-the-way corner of the country, where the shriek and roar of the railway are as yet unheard, is a sparsely populated village of about two score cottages, all that now remains of Dunwich, the old-time seat of Government and capital of East Anglia. Once the largest and most flourishing city in Eastern England, the residence of kings, the see of a bishop, a seat of learning and a port of considerable trade, now its glory has departed, its palaces, churches, monasteries, streets and markets have disappeared beneath the waves. Before the Norman Conquest the sea had commenced its work of devastation, nor did it cease its siege when the ruin of the great city was accomplished.

There are grounds for belief that the old city of Dunwich stood on the site of a settlement of the Roman legions who conquered the Iceni and their queen, Boadicea. Subsequent to the Norman invasion it increased rapidly in population and prosperity. Of the importance of the place in the time of Richard I some idea may be gained from the fact that it was fined 1,000 marks for unlawfully supplying the king's enemies with corn, while Ipswich and Yarmouth, now two of the three principal towns in East Anglia, were only ordered to pay the sum of 200 marks each. In the reign of Henry II it was a town of good note, "abounding in much riches and sundry kinds of merchandises." At the beginning of his reign, King John granted a charter of liberties to the town, by which its inhabitants were allowed to marry their sons and daughters as they pleased, and to give, sell or dispose of their property as they thought fit. Under this same charter, which cost the men of Dunwich 300 marks, ten falcons and five gerfalcons, they were granted "all wrecks of the sea."

About this time Dunwich was probably at the height of its prosperity, and is described as a large city, with many roads, streets, public buildings and churches. The greater part of it stood upon a hill, the base of which was washed by the sea. Its town-hall was an imposing building, its port was crowded with shipping. In addition to numerous churches, it had monasteries of the Franciscan and Dominican friars, each with its own church. In the reign of Edward I, Dunwich sent two members to Parliament.

All this time the sea was carrying on a ceaseless and irresistible siege of the coast. Each succeeding winter saw fresh breaches made in the sand dunes between the beach and the marshes, and frequent falls from the crumbling cliffs. On the night of January 1, 1286, a violent storm wrought great havoc upon the borders of the town. The sea made extensive encroachments and several churches were submerged. During the next twenty years more than four hundred houses collapsed. Later on, the church of St. Leonard disappeared, and before the end of the century two other churches were undermined by the waves. St. John the Baptist's was the next to go, to be followed before the year 1609 by the chantries of St. Anthony, St. Francis and St. Catherine. By this time two of the city gates, the South Gate and the Golden Gate, had been washed away, and only about a quarter of the old town was left standing. The church and buildings of the Knights Templar disappeared during the reign of Charles I, and in 1677 the sea reached the market-place, when the townsmen sold the materials of the old cross. At the beginning of the eighteenth century the gaol fell a prey to the sea, which, in 1729, destroyed the last traces of the church-yard of St. Peter's, the church having previously fallen over the cliffs.—*Pall Mall Gazette.*

NOTES & CLIPPINGS

MODEL OF THE EGLISE DU SACRE-CŒUR.—Two of the workmen engaged in the erection of the great church of the Sacré-Cœur at Montmartre have been occupied during fourteen years in preparing a model, on a scale of one-twenty-fifth, of a longitudinal section of the building. It is four metres in length and a metre in width. The model is complete with the exception of the central dome and the bell tower, which is to be 100 metres in height. It is to be among the contributions to the Exhibition of 1900.—*The Architect.*

OPORTO A VERY UNHEALTHY CITY.—According to the figures published in a local newspaper, Oporto holds the unenviable distinction of being the most unhealthy city in Europe, a statement (writes Mr. Hay-Newton, the English consul) which no one who has walked in its streets will have much difficulty in believing. The sanitation of the city is a subject which, nevertheless, would appear to have been for a long time neglected, but it is a matter which is now receiving some attention from the press, and it is hoped that something will shortly be done to provide the city with a proper system of drainage, owing to the fact that the municipal chamber have now at their head a gentleman of well-known scientific attainments and noted for his energy and administrative capacity.—*St. James's Gazette.*

HYDRAULIC POWER FOR CITY SUPPLY.—The distribution of hydraulic power in London is the biggest thing of its kind in existence. It is not only unique in the sense of being the largest distribution of power from central stations in any city in the world, but it is, excluding smaller installations in other cities, the only instance of a power distribution which furnishes exclusively a power supply. In other systems, viz, gas, electricity and steam, the main intention is to supply light and heat, the supply of power being only subsidiary. Even the compressed-air supply in Paris, which is the nearest in idea to the hydraulic supply in London, is dependent largely upon its lighting business. Hydraulic power in London and other cities is also interesting in another way, in so much that it depends not only exclusively or mainly on the supply of power alone, but that the supply was originally intended to serve and is, in fact, almost entirely used for one special class of business, viz, that of lifting. The lowest rate charged for hydraulic power in London is 1*s*. 6*d*. per 1,000 gallons. The pressure is 750 pounds per square inch, so that each 1,000 gallons contains 8.738 horse-power hours of energy; 1*s*. 6*d*. per 1,000 gallons is, therefore, equivalent to, say, 2*d*. per horse-power hour. It is only the largest hydraulic plants, pumping 20,000,000 or more gallons per quarter, which are capable of pumping at this cost, if to the actual pumping expenses are added the interest and depreciation on the capital value of the plant and the value of the space occupied by it. The largest private pumping plants existing in London are at the railway goods-depots, and at one of the principal and most modern of these depots, at which over 100,000,000 gallons per year are pumped, the pumping cost, exclusive of interest and other charges, is 9*d* per 1,000 gallons, and the total cost would be very little, if at all, below 1*s*. 6*d*. per 1,000 gallons. —*E. B. Ellington in Cassier's.*

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End of an Archæological Quarrel. — After ten years of antagonism, Flinders Petrie has become reconciled with the Egypt Exploration Fund Society, accepted a place on its committee, and is going to work under its auspices. He declined at a recent meeting to disclose the scene of his next excavations, but it will be in a hitherto untouched region and connected with the period of the Libyan invasion that took place 3,000 years before the Christian era. — *N. Y. Times.*

Attendance at European Universities. — German universities ranked as follows, regarding the number of students last summer: There were 4,649 in Berlin, 3,777 in Munich, 2,876 in Leipsic, 1,863 in Bonn, 1,425 in Breslau, 1,415 in Halle, 1,379 in Freiburg, 1,339 in Würzburg, 1,172 in Tübingen, 1,164 in Heidelberg, 1,138 in Erlangen, 1,007 in Göttingen, 965 in Marburg, 948 in Greifswald, 938 in Strassburg, 761 in Jena, 708 in Kiel, 700 in Königsberg, 630 in Giessen, 500 in Rostock, and 420 in Münster. — *N. Y. Evening Post.*

The Iron Rings of 1813. — A great inquiry is now being made in different German towns for the iron mourning-rings of 1813. The history of these curious memorials of German patriotism may not be generally known. During the national awakening against Napoleon in 1813, the princesses of the royal house made an appeal to the people for the sacrifice of personal ornaments, not unlike that made by the Long Parliament at the beginning of our civil wars. Gold mourning-rings were consequently sent in immense numbers to the treasury in Berlin, and each sender received in acknowledgment an iron ring upon which was inscribed, "Gold I give for Iron." From Swinemünde alone no fewer than 114 gold rings were sacrificed to the Fatherland, and iron rings sent thither in exchange. Specimens of these iron rings are now worth more than their weight in gold. — *Westminster Gazette.*

Eating a Church. — Bishop Williams, of Marquette, was recently invited to serve his alma mater, Cornell University, as university preacher. He did so, coming straight from the Synod of the Canadian Church at Winnipeg and bringing this story with him: "There was a missionary Bishop there," said Bishop Williams, "who had been six weeks in coming, most of the way by canoe. He rose and began by saying that he would speak for himself and for a brother Bishop, who, unfortunately, could not be present. He was sorry to say that his brother's diocese had gone to the dogs! A general gloom followed these words. He went on to say that the Bishop had found so many inquiries after religion among the Esquimaux north of Hudson Bay that he had to build a church. As there was no wood he used whales' ribs for rafters, covering them with tanned walrus hide, and so made a church to hold eighty persons. 'All went merry as a marriage bell' for a time, until — the dogs grew famished and ate the church." — *Troy Times.*

Buried Cities in Central Asia. — The Norwegian traveller, Sven Hedin, has contributed to a German Journal, *Globus*, an interesting account of his journeyings in Central Asia in the district north of the Kwenlung Mountains. Ruins of large towns were discovered which had been buried by successive sandstorms spreading over a thousand years, hence very modern from a Petrie point-of-view. Separate houses were uncovered of very fragile construction, consisting of wooden pillars, while the walls were put together of plaited reeds covered with mud. The latter were rendered at once impervious and suitable for decoration by being coated with white plaster. Drawings were discovered on these walls, and well executed, of human figures, horses, dogs, and flowers, and judging by the copies which have been brought back, of no small artistic merit. Small figures of Buddha were also dug up, as well as various fruit trees which told a tale of the bygone days when this arid surface was once made fertile by the waters of the River Kerija. — *Exchange.*

Ventilating the New Memorial Church in Berlin. — The ventilation of a large number of churches is notoriously bad, and bad ventilation has frequently more to do with sleepy congregations than even the dulness or the length of the sermon. Wide interest has been created by the description of a new departure in the system of combined warming and ventilation introduced by Professor Fischer, in the new Memorial Church at Berlin, Germany, which in its general plan resembles St. Paul's Cathedral, in London. To the height of 80 feet from the floor the walls are traversed by hot-air chambers, so that from the ground to the galleries, 22 feet above, there is no perceptible difference of temperature, the air being kept constantly at 15 degrees Cent. (60 degrees Fahr.). The aim of the engineer has been the removal from the space occupied by the congregation of the paths followed by the currents of air conveying the warmth from the sources of heat to the radiating-surfaces by placing the heating-apparatus high up in the neighborhood of the cooling surfaces, maintaining, in reversal of the usual procedure, a higher temperature in the upper portion of the building, and intercepting and reheating the cooled air in its descent toward the lower part occupied by the congregation. There are thus four strata of air of different temperatures. Professor Fischer maintains that the system of heating the upper more than the lower regions of the air is the only proper course in such lofty buildings as churches, for whereas with the ordinary method the air heated on or below the ground-level is cooled on reaching the roof and, fouled by the products of respiration, descends again onto the heads of the congregation, unless withdrawn by an exhauster, in his system the fresh air is warmed to an agreeable temperature in its passage through the channels in the walls. Furthermore, its ascent is encouraged by its being led through two sets of heating-coils. In the dome there is a third set of coils, which, although they do not contribute to the warming of the parts occupied by the worshippers, serve effectually to prevent the descent of the foul air by promoting its continued ascent toward and escape through the apertures in the lantern that crowns the edifice. — *St. Louis Globe-Democrat.*

Artesian Wells in Kansas. — Artesian wells, instead of being expensive luxuries, are cheaper than pumps in the Great American Desert — an elliptical oasis, of which one focus is at Wilburn, Kas., and another at Meade, its long axis being formed by Crooked Creek, a winding stream. This little lozenge-shaped district is probably the best-watered portion of the earth's land surface. So easily is water attainable that a farmer may have artesian wells all over his property and at any spot on his premises he pleases — none needing to be more than fifteen or twenty feet deep and none costing more than fifty dollars. Of such wells there are over two hundred and fifty in the district, yet so unintelligently is the water-supply managed, that in nearly every case the greater part of the flow simply runs away into Crooked Creek. A few of them yield forty-five gallons a minute; others, from twelve to twenty; the majority grading on, down to eight or ten gallons. The total amount yielded would submerge 12,000 acres a foot deep every year. — *Fire and Water.*

The Destruction of Architectural Landmarks. — At the recent meeting of the Royal Institute of British Architects, held at London, the President, Professor Aitchison, inveighed against the destruction of so many notable architectural landmarks in England. He said: "To wantonly destroy these built records was worse than to burn unpublished written records. 'The accursed greed of gold' was, however, destroying all the virtues of our people, as it did those of the Romans, and making it hold nothing as sacred where gold was to be got by its destruction. The beautiful Hanover Chapel, in Regent Street, designed by C. R. Cockerell, the most refined and accomplished of modern English architects, was now being pulled down to make way for shops, which paid heavier rates and taxes. The magnificent Church of St. Mary Woolnoth, the masterpiece of Nicholas Hawksmoor, and a proof of the former piety of London, was threatened with destruction for a railway station. If this ignorance of the value of architectural monuments were not dispelled, and the greed of gold continued, those who lived long might witness the conversion of St. Paul's Cathedral and Westminster Abbey into railway stations!"

The Inventor of the Lucifer Match. — France is about to honor with a statue the man who did not invent lucifer matches. In 1830, it seems, M. Nicolet, professor of chemistry at Dole in the Jura, was illustrating before his class the explosive properties of chlorate of potash, when it struck one of his pupils, Charles Sauria by name, that a combination of phosphorus with the detonating chemical might furnish a far more satisfactory means of kindling a fire than the old flint and steel. He set to work upon the problem, and his experiments and those of his friends were attended with success. A year or two afterwards M Nicolet visited Austria, and gave the discovery away to German manufacturers. Without wishing to rob M. Sauria of the posthumous glory which appears to be the only reward of his ingenuity, patriotism compels us to claim the merit of being the real inventor for one of our own nation. Mr. Walker, of Stockton, by the use of chlorate of potash and sulphide of antimony, was making friction matches as early as 1829. Young Sauria very likely never heard of his process, but the Germans certainly did, and it was from his original idea that their trade sprang up and fructified. — *London Chronicle.*

Almshouses due to Racehorses. — During the ten years that the Duke of Portland was on the turf, he won the Derby of 1888 with "Ayrshire," and again in 1889 with "Donovan." In 1888, moreover, he won the Two Thousand Guineas race, and in 1889 the St. Leger. In 1890 he won both the Oaks and the St. Leger, and at the close of the season he was at the head of the list of the year's winners of stakes. These amounted to a very considerable sum, and at the request of the Duchess he devoted the entire amount of his year's winnings to the construction of a row of almshouses for the benefit of the widows of the Welbeck estates. These houses are models of architectural taste and of interior comfort, and are within easy reach of the Abbey, so that they are under the personal superintendence of the Duchess. On the central gable of the building runs the inscription: — "These houses were erected by the sixth Duke of Portland at the request of his wife, for the benefit of the poor and to commemorate the success of his race horses." Then follow the names of the latter as well as of the races which they won. — *Marquise de Fontenoy in the Philadelphia Press.*

One Way of Looking at Things. — "Gerrymandering" has become so prevalent in the United States, it is hard to say where the practice begins or ends. One testimony to its power is seen in the resolution passed at the Congress of the American Architects on October 22, viz, "That the permanent headquarters of the American Institute of Architects be located in the City of Washington at as early a date as is possible, and that the executive committee be empowered to make such arrangements as are necessary." It may seem strange for architects to seek a place where the principal industry is politics. But there is reason for the change. The architects have been trying in vain to obtain a change in the law by which non-official architects could be enabled to compete for designing Government buildings. It is supposed that by having the headquarters of the Institute in Washington there would be more facility for diplomatizing with congressmen. It is also contemplated to make the licensing of architects necessary, and influence in Washington would be of use for this purpose. Although the War, Navy and Agricultural Departments have instituted experiments on materials more elaborate than any known in Europe, there is a desire to persuade Congress to vote money for special tests under the direction of the Government architect, and that is not likely to be agreed to without perseverance in lobbying. — *The Architect.*

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AS with this issue the *American Architect* completes the twenty-first year of its existence, and so rounds out the term which is usually assigned to the adolescent period of man's development, and as this period corresponds precisely with the birth and development of modern architecture in this country, our readers might be disposed to pardon us should we indulge in a review of these years and point out where and how this journal has, as we think, ably played its part and been of real service to the profession. We might, too, indulge in prophecy and declare that if our advice and aid have been productive of good during the period of our editorial youth, it might fairly be inferred that our manhood's work would be more effective still. But to do either of these things would be mere waste of words. The journal speaks for itself; it is and has been either good, bad or indifferent, either effective or ineffective, either an aid or a detriment in all that concerns the growth of an enlightened appreciation of architecture on the part of the public, and a better understanding of its requirements on the part of those who undertake to practise it. What we have done in the past has been done always with the best of intentions and the most unselfish of motives, and we have no reason to suppose that in the second climacteric period now opening our methods of work and the work itself will have any other than a normal development. To mark this entrance to manhood's estate, as it were, we propose to increase this year the number of illustrations to be published, and specifically charge ourselves with the maintaining the real architectural value of this additional matter. If architects who kindly contribute drawings will, in their turn, charge themselves with making sure that the drawings they contribute also have a specific, and not a merely general, value, we feel that much may be done, and with no great difficulty, to make the illustrations published from week to week more useful and interesting than ever.

ARCHITECTS who are careless about their certificates should take warning from a case recently decided in England. A certain architect agreed to furnish plans and specifications, and superintend the erection of a house, to cost about forty-five hundred dollars, for the modest sum of seventy-five dollars. When the plans were ready, a contract was made with a builder for their execution, with the stipulation that payments should be made on account of the contract price, upon the certificate of the architect, at the rate of not more than eighty-five per cent of the value of the work done. Things went on for a time, when the builder failed, and the owner had to get the house finished by other parties, at a total cost of nearly six thousand dollars. It then appeared that the architect had given certificates to the original contractor to an amount greater than the value of the work done, and that he had been paid thirty-five hundred and fifty dollars on these certificates, when he ought only to have had twenty-four hundred. The owner, who was a lady, sued the architect for negligence, claiming as damages the difference between what she had actually paid the first contractor and what she ought to have paid him, if the architect had certified only the proper amounts, and was successful, the jury awarding her a thousand dollars, which the architect had to pay. A very similar case was decided in Canada some years ago, in exactly the same way, so that architects may make up their minds that there would be small chance of escape for others caught in such a predicament.

THERE is something interesting, however little one may sympathize with new ideas on such subjects, in the progress of the fashion of cremation of the dead. Singularly enough, cremation is practised to a far greater extent in Paris than anywhere else, not because the Parisians have lost their characteristic respect for death and the departed, but for the reason that the bodies of friendless persons who die in the hospitals, as well as the subjects from the dissecting-rooms of the medical schools, are burned, instead of being buried. According to an article in *Le Monde Moderne*, which we can highly commend to our professional readers, on account of its beautiful illustrations of the monuments in the great cemetery, the *four crématoire* in Père Lachaise, which was built in 1888, has, since that time, consumed about thirty-five thousand bodies. It is not surprising that its chimneys give off a perpetual cloud of vapor, but only a very small portion of this comes from the remains of persons who have voluntarily chosen that mode of disposal. In 1890, two years after the establishment of the crematory, there were one hundred and twenty-one "paid incinerations"; the next year there were one hundred and thirty-four; and the number has continued to increase steadily, reaching two hundred and eighty-seven in 1895. A part of these cremations probably took place at the desire of relatives who wished to spare themselves the trouble and expense of an ordinary funeral; so that the spread of public sentiment among Parisians in favor of incineration for themselves is, apparently, very slow.

IN this country, cremation seems to be more in public favor, but the antics of certain people, who tried to make use of it to show their aversion to religion, have probably done much to counteract the effect of its undoubted sanitary advantages. The crematory at Fresh Pond, on Long Island, which has been in operation for eleven years, is said to have incinerated 1,881 bodies, two-thirds of which were those of men. Of the others, 496 were those of women, 98 of boys, and only 73 of girls, few people, apparently, being able to reconcile themselves to the idea of burning the corpses of their little children, whatever might be their fancy as to the disposal of their own remains. At the Fresh Pond crematory there is, apparently, no gratuitous incineration. Thirty-five dollars is charged for the burning of a body, if the ashes are simply collected and given to the friends of the deceased. If they are put in an urn, this must be purchased, at an expense varying from nine or ten dollars, upward, and a niche in the "Columbarium" to receive the urn costs from fifteen to twenty-five dollars, and a door to keep it safe costs an additional sum. This, of course, does not include the expense of carriages for mourners, or any of the usual accompaniments of a funeral.

ACCORDING to one of the daily papers, Mrs. Kitson, the sculptor, is engaged in executing a colossal statue of one of the most peculiar heroes who ever adorned our history. This great man is Ezekiel Hopkins, the first Commodore in the American Navy, who served his country on the sea for the space of ten months, during which he spent his time, according to the testimony of one of his principal officers, in "keeping out of harm's way"; had his proceedings investigated twice

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by a Committee of Congress, and was publicly censured on account of them, and was finally dismissed the service in disgrace. The soul-stirring memorial which is to recall his exploits is to stand in the City of Providence, where it is, apparently, to teach future generations of Rhode Islanders how undying fame is to be won. Without being too critical in regard to other people's affairs, it certainly seems as if more discretion might be exercised than is usual in this country in the choice of subjects for public memorials. As our Governments, National, State and municipal, avoid, on principle, any meddling with the fine arts, such statues as we have are almost all paid for by private subscriptions from people who often know very little, and care still less, about the merits of the personages whose career they help to commemorate. We remember very well the starting of a formidable subscription in New York to pay for a statue of William M. Tweed, to be set up in some conspicuous place in the city; and if the original of the statue had not been just then indicted and shut up in the penitentiary, there is little doubt that the subscription list would have been filled, and the work carried out.

NOW that the United States has become the greatest iron-producing country in the world, it is quite time to think of utilizing the incidental products of the iron-manufacture, as is done in Europe. In Germany and France, the slag from blast-furnaces is now converted, on an immense scale, into cement, which, although somewhat less uniform, apparently, than the best Portland cements, is capable of replacing them for many purposes, and may be utilized, in the place where it is produced, for making drain-pipes, tiles, paving bricks and many other materials which are always sure of a market. Among us, the conditions are particularly favorable for such an industry. A large part of our most productive iron-furnaces are situated in the South, in the very part of the country in which good cement is obtained with most difficulty, while labor, to convert the cement on the spot into useful articles, is comparatively cheap. Many slags, where lime is used for a flux, contain, without addition, just the proportions of alumina, silica and lime of the best Portland cements; and, where the natural proportions are not just what is required, any ingredient that may be lacking can be added to the slag in the grinding.

EVERY one knows that it is becoming common now to join the rails of railway tracks firmly together at the ends by welding them in place with an electric welding-machine. Continuous rails nearly ten miles long have been made in this way, and, as it is always the ends of the rails, at the joints, which are first battered to pieces by the shock of the car-wheels running over them, the continuous track is more durable, as well as more favorable to comfortable travelling and to the life of rolling-stock, than the ordinary track, made up of short, separate rails. In the continuous track, however, is involved a curious physical problem. It is unnecessary to say that, in the ordinary system, the short rails are laid about a quarter of an inch apart at the ends, to allow for expansion by heat, and there are many instances of derailment due to the contortion, in hot weather, of rails laid without sufficient space between their ends. If, then, a rail twenty-five or thirty feet long must have a quarter of an inch play at the ends, to prevent it from being forced out of shape by expansion, how is it possible to use continuous rails ten miles long, with no provision for expansion? The practical answer to this question seems to have been discovered before the theoretical one. Although it was at first feared that the effect of expansion would be such as to make it dangerous to weld more than two or three rails together, it was found that no evil result came from increasing the number, and there is now apparently no limit to the safe length of the continuous rail, the distortion due to expansion being no more serious in a rail ten miles long than in one of thirty feet. *Le Génie Civil* gives an interesting explanation of this phenomenon, due to M. Ch. E. Guillaume. As an introduction, M. Guillaume recalls the fact that a metal bar is capable of being compressed or extended to a certain amount by mechanical force, returning, if the force does not exceed the elastic limit of the metal, to its original form after the removal of the strain, and shows that mechanical force, within the elastic limit, can be applied to counteract the effect of thermal expansion or contraction. Thus, supposing that a steel wire will stretch one twenty-thousandth of its length under a strain of one kilogramme to the square millimetre of section, it is evident that if such a wire, suspended from a fixed point, is exposed to a certain fall in temperature, in this case of about four and one-half degrees Centigrade, and, at the same time, weights are gradually attached to the lower end, to the amount of one kilogramme for each square millimetre of section of the wire, the thermal contraction, due to the fall in temperature, will be exactly counteracted by the stretching due to the loading, and the length of the wire will remain unchanged. Moreover, as both the stretching due to the load, and the thermal contraction, are proportional to the length of the wire, they will compensate each other in a wire a mile long just as accurately as if its length were a quarter of an inch. In the case of continuous rails the same action takes place as in a suspended wire. While a short rail, which is free to move, must yield to all the effects of thermal action, a continuous rail two or three miles long, weighing from one to two hundred tons, and attached to the ties by three or four thousand spikes, is in the condition of the wire attached at one end to a fixed point, and carrying at the other end a load, or resisting force, which only comes into action in case of thermal effort on the rail. When this rail is heated above, or cooled below, the temperature at which it was laid, the expansion or contraction due to the change in temperature is resisted by an immense force of friction, distributed throughout the length of the rail, and converting the thermal effect into a strain of compression or tension in the substance of the rail itself, instead of the actual lengthening or shortening which would be produced in a rail which could move freely. It is evident that this strain of compression or tension may be very severe, and that, being proportional to the length of the rail, it will be better endured by a rail of large sectional area than by a slender one, and this conclusion accords with observation, which shows that light continuous rails suffer far more from thermal effect than heavy ones.

PEOPLE who wish to send machinery, models, or even drawings, by public carriers, should learn a lesson from a case recently decided in France. A certain M. Lefèvre, having some important and pressing work of excavation to do, ordered an excavating-machine from M. Pelous. The latter sent the machine by fast freight, packed in seven boxes. Six of the boxes arrived safely, but the seventh, which contained the bolts required for setting up the machine, was lost on the way. Not being able to put the machine together, M. Lefèvre could not use it for his work, and suffered a considerable loss in consequence. He sued M. Pelous for damages, suffered in consequence of his failure to deliver the machine in condition for use, and the latter sued the railroad company, to whose fault the failure was due. The company acknowledged that it was responsible for the loss of the box of bolts, and tendered their value, amounting to a few francs. As to any further damage, the company disclaimed liability, under the rule of the Code, which says that "The debtor is liable only for damage which was foreseen, or might have been foreseen, at the time of the contract." This defence might have prevailed, but it was shown that when the box of bolts was shipped, the marks upon it plainly showed that it formed one of a series of boxes containing parts of a machine, so that the company could infer that all of them were necessary for the proper setting-up and operation of the machine; while the fact that freight was paid for at a very high extra rate, in consideration of quick delivery, was held by the Court to be sufficient evidence that any delay in the reception and putting together of the machine would be prejudicial to the consignee; and the railroad company was condemned to pay the damage that Lefèvre had suffered.

ARCHITECTS visiting New York should not fail to see the new drawbridge over the Harlem River, which, when completed, will be the largest in the world. The design of the bridge does not differ materially from that of other draw-spans recently built in this country, but the scale is unusually large, and, as it happens, there is a very favorable opportunity for examining it. In connection with the new bridge, an interesting viaduct, for four tracks, is in process of construction through the upper part of the city, high above the present tracks, supported on columns, which rest on foundations contained in the present retaining-walls. The whole work is a marvel of ingenuity and forethought, and, as such, will command the appreciation and admiration of architects, nearly as much as that of engineers.

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THE CASE AGAINST THE ÉCOLE DES BEAUX-ARTS.[1]

THE title which the Secretary of the Society and I selected for the very short paper I am going to beg you to listen to with such Christian charity as you possess, is hardly descriptive. It is a little in the line of a "scare-head" and I want to modify it. I don't mean to savagely attack the École des Beaux-Arts, and by implication, all other Architectural Schools where the academic system of instruction is in vogue. If I wanted to, I should not have the right, for I never had any practical experience in any school of that kind. I should be adopting the malodorous tactics of a certain notorious personage in this city, who proceeded to damn the exquisite statue of a Bacchante, now flitting elusively through the courts of the library, before he had seen it.

What I *do* want to attempt, however, is an inquiry into the methods and results of this system of education, with a view to finding out if it isn't defective in certain directions.

Ever since I came to look on church-building as one of the most promising fields of architecture, and as one of the most dignified and satisfying as well, I have been thinking more or less about the present system of architectural instruction which by implication denies that architecture existed between the Fall of Rome and the Sixteenth Century, and also ignores the fact that churches are ever built nowadays, or that they are a legitimate subject for an architect's consideration. The more I thought about this curious phenomenon the more remarkable it appeared, but I set it down to the rationalism that pervaded every department of life, until a few years ago. Of course it was impossible for atheism to acknowledge any beauty in the work which owed its genius and its very experience to an exploded superstition, while it was equally impossible that the buildings which were grotesque anachronisms, the outward expression of a fast perishing folly, should be looked on as matters of the least importance. Under the circumstances, ancient and neo paganism were the only modes of civilization that offered anything of value as models for contemporary architecture.

I still think this motive lay at the bottom of the thing when the present method of architectural education was evolved, but during the last year or two, various things occurred which led me to think that other criticisms might be brought against the accepted system, besides its ignoring a very important branch of the art and doing nothing to assist students to acquire some knowledge that would be of use to them in this field. Among other things, I became convinced that much time was wasted in acquiring useless methods and information, that false canons of taste were often laid down, that enormous labor was wasted in cramming the mind of the student with the most minute details of construction, strength of materials, etc., in order to fit him for practical work, while almost nothing was done to help him to tackle the only problems that in all probability would come before him for the first ten years of his practice.

I mean to speak of these things more explicitly by and by, but first, I want to tell you just what the events were which brought me to my present position of antagonizing this system of classical education.

Well, first of all, some time ago I knew a young draughtsman who was enthusiastic and eager to acquire all the useful information he could find. He joined a class in planning, directed by a very brilliant representative of that system which prides itself enormously on its prowess in this particular direction.

There was trouble from the start. This boy was practical to a degree and loaded with common sense. He soon found out that the questions of convenience in arrangement of rooms, their dimensions, economy of space, adaptation to function, harmony with environment were secondary considerations. There was one great thing to be obtained, and that was a decorative plan. The lights and darks must be well proportioned. Formality and perfect balance were indispensable, and a finely drawn piece of mosaic flooring made amends for a deplorable lack of light.

In fact, he was really engaged in decorative design, not in architectural planning.

Diplomatic relations finally ceased in this wise: he grew weary of designing impossible city-halls and inadmissible Italian villas, and handed in — horrible to relate — a scheme for a large village church, English Perpendicular in style, and carefully arranged with regard to its needs and possibilities. Of course, he did very wrong to do this; he should have known that a country church is not to be spoken of in academic society. The plans went in, however, and there was war. When the instructor got his breath he tackled the awful situation bravely — for he was a conscientious man. I saw the result afterwards, when the smoke had cleared a little. What had been a good plan, well adapted to its functions and laid out with due regard to cost and surroundings, irregular of course, and capable of very picturesque, though quiet treatment, had become a nice study in black lines and spots, and white areas beautifully proportioned to them. It was admirably done, and would have made a charming figure in a formal wall-paper, but it would hardly have commended itself to a building committee.

So far as the exterior was concerned, the revolution was complete. Every vestige of English spirit was gone, and Montmartian Romanesque had taken its place.

A little later, a friend in whom I was very much interested, and who was just about to graduate from the architectural department of a prominent school, asked me if I did not think it would be a good idea for him to submit a design for a Gothic church as his thesis. I remembered the experience of my friend the draughtsman, and tried to dissuade him from his insane idea. He persisted and fought nobly. Day after day with tears in his eyes he told me how his cherished plan was being maltreated, until it was fast becoming that kind of thing one finds in trade-books on church-building. At last he gave up the unequal fight, for he had been kindly but firmly advised that he was running an awful risk in sending in such a thing as a thesis drawing of a Gothic church. He began again, and achieved a proud success with an Italian villa, in which the toilet-room and breakfast-room were beautiful oval apartments of equal size, balancing nicely, while the library occupied one projecting wing, the kitchen the other — the external treatment being identical.

Finally, one of our boys wanted to take a course in an architectural school and asked my advice as to where he should go. I did my best to study up several schools, and in the process I found out things I had never known before. In one school the academic rendering was something exquisite, and the beauty of the transparent shadows and the lovely smalt trees was only equalled by the fabulous size of the sheets of paper on which a little square of plan was magnificently surrounded by the most wonderful gardens. I reflected, however, that it took a month of a boy's life to create one of these charming things, and that after he left the school no conceivable circumstances could arise which would lead him to indulge in this form of decorative art, and so modified my admiration.

In another school I was assured that the system of instruction was modelled with absolute fidelity on that of the École des Beaux-Arts, but I reflected that in America a young architect's duties are chiefly the designing of country houses and churches, and that the results achieved in these lines by the output of the École — so far as France is concerned — are not brilliantly successful. Finally, I recommended the architectural course at Harvard as the most practical and logical, and as the one least accurately modelled on French lines, and I have no reason, thus far, to regret this decision.

The result of my experiences and investigations was that I became convinced that the accepted system of education, as we see it in the École and in practically all but one of the schools in America, did more harm than good, and I want to justify this position if I can.

First of all, however, I must declare my intense admiration for certain principles held in this system, and my gratitude for the influence exerted. It is unnecessary to plead for these things, however, for every one admits them. One is the steady curbing of a student's tendencies towards fantastic originality, silly picturesqueness, crazy irregularity. I doubt if this work could be done better than it is, and it is imperative. It is about the only thing that can reform architecture in America and redeem it from its only too often fantastic absurdity. There are many other fine points in the system: the thorough grounding it gives in the classical orders, the training it affords in proportion and composition, the solid kernel of good in its system of planning; but if none of these existed, the first *raison d'être*, the civilizing of barbaric impulses, would be cause for praise and admiration.

On the other hand, the faults are, I think, quite as clear and deserving of sincere condemnation.

Many of these faults, while not very grave in themselves, have a mischievous effect for the reason that, in too many cases, young men are subjected to them at just the wrong time. If a man could have three or four years' experience in an architect's office, then travel for a year or two on the Continent and in England, he would be proof against bad influence; his taste would be formed, practical ideas and the nature of every-day requirements would be instilled into him, and he would then be in a position to reject the bad and accept the good. And he would do this. Very few men, after a little solid experience and a fair acquaintance with the architecture of Europe, could fail to see through some of the methods and principles with which he would come in contact in the École. This course is seldom pursued, however, and a raw, unformed youth goes through an American architectural school, and then passes directly to the École, and the result is that in many cases his taste is vitiated, and he is in no position to select the great good which is afforded him, together with much of what I think very bad, and which if he would succeed he must diligently forget.

I have had occasion to advise a lot of boys as to how they should educate themselves for the architectural profession, and in every case I have urged them to get a little practical experience first, then see all they can of the art of the past, and *then* go to some academic school.

Admitting, then, that students are themselves largely to blame for the harm done them, since they start at the wrong end, let us see just what the harm is — at least, let me suggest what it seems to me to be, for I can only express my own feelings in the matter. I have no right to claim to represent any one else.

In the first place, the education in design is not practical; it does almost nothing to fit a man for actual practice. In the American school a student is crammed with stores of information that belong by right to civil engineers, sanitary engineers, specialists and experts. Judging from the list of studies in any four years' course, one would conclude that the object was to turn out men who could start in business the day after they took their degree, armed at every point and absolutely independent of experts and engineers

[1] A paper read by Mr. Ralph Adams Cram before the Boston Society of Architects, December 4, 1896.

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for all time. Look at the artistic side and you find the exact reverse. In nine cases out of ten, a man just through an architectural course has never designed a country house, an eight-room schoolhouse, a country church, an apartment-house, or any other of the very things which alone he can get a chance at for ten years of his professional life. His custom-houses, post offices, city-halls, public baths, have been designed for ten-acre lots, and with a ward politician's disregard of expense. He has been taught to space his voids and solids with exquisite delicacy, but in almost no case can he yield to this instinct in the future, for the conditions won't allow it. If by good luck he gets a chance at some big public building, he lays out the plan on a system of units, and when it is too late, he finds that hot-air ducts and exhaust flues have played tag with them. He has a twelve-story office-building sprung on him and looks in vain for scholastic precedent. Finally, in despair he takes a lot of theses and pastes them together, one above the other, and trusts to the great American public to justify him.

Submit this statement to an advocate of the schools and he will wave it away. "We teach the great fundamental principles of the art, we cannot concern ourselves with the details." But that is just what the poor architect has to do, and until he has made his reputation, designing houses and churches, and his fortune building steel-framed slices of office-buildings he must keep his mouth shut as to the great principles of the art.

Of course, it seems to me that it is a crime and an outrage for any alleged system of architectural instruction to ignore the great centuries of the Middle Ages, to deny that there ever was such a thing as Gothic architecture, and to forget that churches are still to be built. I am an awful fanatic on these points, and so I don't dare say very much about them, but it is my solemn conviction that if we ever succeed in civilizing ourselves, we shall one day admit that Gothic architecture is just as perfect in style, just as solidly based on knowable laws, just as representative of high civilization as the architecture of corrupt and tottering Rome and of the immoral Renaissance; while in impulse, in spiritual power, in beauty of line and mass, and light and shade, it is incomparably more worthy of study and of admiration.

Nor is the argument that it is unfitted to modern uses valid for a moment. It does not go in the matter of office-buildings and synagogues and Unitarian churches, and city-halls, of course, nor ever can, until both style and requirements are modified by time. It is not in harmony with modern civilization; it is an anachronism, that also is sure. But it *is* in harmony with the nature of those still vital institutions, the Roman Catholic and Anglican Churches, which are still blazing anachronisms — thank God.

Yet the great period of architecture when it was essentially *Christian*, that period which expressed itself in a form which is incomparable for splendor of imagination, loftiness of spirit, sublimity of inspiration, absolute, abstract beauty of form and composition and design, has no place in the modern system of academic instruction, and I propose to hold with all the vigor I can command, that a system that wilfully shuts its eyes to all this marvellous period of art, so instructive, so civilizing, so full of inspiration — is a bad system.

Here is another criticism on a different line. In nearly all the schools which ape the École, a vast amount of time is given to the matter of academic rendering. I wish I knew just what this training is supposed to accomplish. We live in a period when an architect who knows how to render his drawings is pulled back to the level of those who don't, and he must sacrifice his ability for the good of a less competent man. Therefore, a competition perspective is "rendered in line only, without shadows or accessories, and with one figure intended to give scale." Under the circumstances, the old fetish of academic rendering would seem to be no longer potent, but it is dominant just the same, and hundreds of valuable hours are wasted by misled students in making wonderful drawings that are without the least practical use whatever. Neither are they beautiful. They are wonderful as examples of manual dexterity, but, for the life of me, I can't see that they are anything more, and the time lavished on them might, I think, be at least equally well employed in learning that there are in existence buildings in Chartres, and Amiens, and Gloucester and Durham, which may possibly be worth looking at.

I have already referred to the defects in the boasted academic system of planning. Let me specify them a little more carefully. They appear to me to be very serious. I have studied academic plans a good deal, and it seems to me that the majority of them show signs of having been studied out as problems in decoration, not in building. That is, the student has had in mind the making of a decorative design which should be pleasing to the eye, not necessarily compact in arrangement, convenient in composition, or indicative of fine effects in actual construction. Looked at as an ornamental figure, the typical academic plan is very successful. In a competition it would receive no consideration. If used as a working plan the resulting structure would be a failure.

Again, in the Ecole at least, I know it to be a fact that the only drawings that are considered as important are the first-floor plan and the front elevation. The former *must* be powerful and imposing — on paper; the second-floor plan may come anyway, and as for the section, it is worked out on the last day, principally by "niggers." I believe the general experience is that it never comes out right, but this does not matter, for constantly designs are placed first, the sections of which show that they could not be constructed, while the second-floor plans show chimneys starting from the ceilings of "*salles des fêtes*" or anywhere else, and partitions without any support whatever. And there, also, is a point to be severely criticised, the undeniable fact that in spite of the apparently severe first year's training in construction, this item is not at all considered in the design, and it does not militate in the least against the success of a plan that the partitions and chimneys on the second floor depend for their support on the same miraculous agency that held Mohammed's coffin suspended in mid-air.

It is the same in the matter of lighting and ventilation. So far as studies are concerned, students are taught enough about these things theoretically, but are they induced to apply their knowledge in actual design? I am told not, and I have known of innumerable cases where much-praised designs have had as features, important rooms with a single window in one corner, and school buildings with no provisions for ventilation whatever. In the first case, the rooms *had* to be where they could not be lighted, for the balance of the plan demanded it; in the second, heating and ventilating shafts were omitted, because they were ugly and injured the unity of the plan.

It may be said that the idea of the system is not to teach practical design, but to create in a student's mind an ideal to which he will afterwards always endeavor to approximate. This may be, but if an ideal is utterly impractical, it is not much use as an ideal.

Then there is another criticism, the last I shall inflict on you. I know for a fact that in certain schools types of architecture which are inherently and damnably bad are held up to honor over types which are eternally good. Here is an example which came under my notice: The *projet* was a doorway. Among the designs was one, rococo to a degree, the columns on either side being drums, alternating square and round — you know the style. With it was handed in a drawing equally well rendered, but in a pure and delicate version of the early Italian Renaissance. The first represented a style debased and corrupted, the second, that style while it was pure and admirable. The rococo design was placed first in the award.

Now this is a small matter, but it is significant, for if it is possible for the academic system to become an agency for the debasing of a student's taste instead of cultivating it, it is a legitimate subject for savage criticism.

These are some of the reasons a certain class of men have for distrusting the system at present in vogue in architectural schools, and the prejudice is growing, not lessening. Recently we have seen an honest and a courageous attempt made by various men who have studied in the École, to exalt its name and influence. But does their method do away with the distrust of those who cannot accept the teachings of the academic system? On the contrary, it intensifies them. Unless I am mistaken, these zealous upholders of the École, nearly all of them masterly architects to whose work one must look up with honest admiration, inaugurated their movement with a competition drawn on the most approved lines of the École des Beaux-Arts. I read the programme with delight. Anglomania wasn't in it. This was Gallomania raised to the nth degree. Once more our immortal old friend put in appearance, the "wealthy amateur" with the precious columns and amazing tastes, and, to prolong the influence of the Academic system, draughtsmen were urged to yield to the blandishments of the aforesaid wealthy amateur, and assist him to dispose of his white-elephantine columns to academic advantage and the glory of the system.

I am sure I was not the only one who wondered where was the use of all this, of what possible benefit could it be to young fellows who are trying to make a living out of architecture. Where *was* the good? I confess I could only think of the lamented Mr. Pecksniff, who was such a shining light in the profession, "Well, you might design a *pump*: now a pump is *very* chaste practice."

I am told that the problem this year is on the face of it a very complete surrender to Americanism and modernity, being nothing more nor less than a harmless, necessary, tavern. This is excellent. Visions rise up at once of a lot of drawings wrought out in varying styles. One, perhaps, with the dignified walls and delicate details, the magnificent chimneys and fine verandas of Colonial Maryland. Or it may be one that brings back the memory of jolly days in little English country towns, with the amiable bar just behind and a "pint of bitter" at one's elbow. With this subject, the chance for young architects to do work that should be charming and in every way appropriate is infinite. But will any design on English or American lines find favor? Hardly. One would risk little in wagering that the prize design would be laid out on a unit of eight, that its roof would be low and covered with red tiles, and that it would bask in the glare of a Connecticut sun, in the midst of colonnades and pergolas, and fountains and statues shown by little vermillion squares.

Well, here is where I stop what you will think a very unbridled tirade, but I assure you that I mean no harm by it. If anything can curb the ardor of our untamed American spirit as it expresses itself in architecture, it is the influence of academic training. But just because it may do this, it does not follow that the system is impeccable. For my own part, I still think it is peccable, and I don't know why I shouldn't say so. If, instead of exalting the École and all its works to the skies, its advocates would try to see whether or no the local and contemporary conditions in America might not modify it to advantage, we might obtain a system which would be

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above criticism — even of architects who never had any academic training, whereas now we have one which knocks the nonsense out of students but doesn't put much sense in its place. A system which strives to destroy, but does not succeed in building up — in which respect it resembles this dissertation.

DISCUSSION.

MR. PEABODY being called upon, spoke somewhat as follows:

As the oldest "*élève de l'Ecole*" present, he would like to say something in loyal praise of his old *atelier* and of his "*patron*." In fact, his respect for their instructions gained constantly as he increased in years and experience.

Mr. Cram had, however, set forth his views in so captivating a manner as to take one's breath away. His clever words had here and there such evident truth in them that it was difficult not to agree with a few of his conclusions. But even Mr. Cram would probably admit that the plan of an Italian villa which he had described was a bad French plan and not a good one; bad as any other plan of any other school can be bad. A French master would avoid the errors that Mr. Cram had pointed out and would make the most of the good that can be gained by academic study. Surely, a system that could produce the "Grand Prix" designs of the earlier part of the century must be a good system. If in these later days the same high standard is not maintained by Grand Prize men, it must be owing to the present quality of the French students and people rather than to the system.

Probably the reason that most of us think well of an academic and classical training is that it is a powerful agency against the barbarisms and license to which among us both students and architects are prone. It is a better corrective to such failings than a training founded on the more restless, picturesque and complicated models that appeal so strongly to Mr. Cram.

Mr. Peabody was glad to hear the Harvard School commended, for he thought that Mr. Warren and Mr. Newton had started with a sound and proper theory. Most of us see a source of weakness in adopting blindly in our American schools formalities that may, perhaps, be suitable in France. These gentlemen are acting upon a theory which most of us can cordially indorse. They hope to apply the methods of the French École to modern and native American problems. In this way, perhaps, the principles inculcated at the École can best be turned to American uses. We who are indebted to that famous institution can, perhaps, in no better way express our loyal appreciation than by encouraging such reasonable adaptations of her principles.

MR. C. HOWARD WALKER said that in a discussion of Mr. Cram's paper, it would be evident that his point-of-view would not be as far away from the best qualities of the École teaching as at first appears. Academic training lays stress upon the beauty of proportions, both in plan and elevation, and it is proved by experience that there is an actual connection between a beautiful plan and a good exterior, even if one is not the corollary of the other. The objection to be made by us is not to the creation of a conventional method of treatment, but to the subsequent carrying that convention to an excess, which is very plainly manifested in the work of the Beaux-Arts men. As it happens, it is a convention which is inferior at its best to the greatest work of Greece and Rome, and of Renaissance and Gothic periods, and upon this inferior standard is based a conventional method of design, which in the hands of mediocre men must fall correspondingly below the ordinary work of the past.

If the work of the École in the early part of the century, the work of Famin, Percier, Fontaine, and later of Labrouste and Duban, and still later of Vaudremer, is held up to represent the result of the École teaching, I imagine Mr. Cram's contention would be much less, but unfortunately this does not represent the general result of École teaching.

I made at one time a list of most of the important buildings erected in Paris from the year 1800 to the present day and published the list in the *Architectural Review* with the names of the architects — and, with a few exceptions, such as the Opéra, the Cour de Cassation, the Bibliothèque St. Geneviève, from 1830 to the present time these buildings were far from being very creditable performances; yet they may be held to represent the average of achievement of the École teaching.

The formulated conventions of this teaching, based upon axioms and developed into idioms, are to be forced upon us whether we will or no, and despite natural conditions and desires.

It is to this deliberate attempt to cram Beaux-Arts methods down our throats and to make the designer bolt whole all the "*bêtises*" of the French school which produces a revolt, and if I am not mistaken that revolt is already apparent in the ranks of the Beaux-Arts Society men themselves. Academic teaching is one thing, École des Beaux-Arts teaching quite another. The former uses as factors some very well-established architectural motives as a means of defining proportions; the latter, starting out with the same intention, has shown and still shows an ever prevalent taste for the most debased forms of those architectural motives, and considers that its lack of discrimination has as its compensation the very fundamental principle of just proportions upon which all architecture worth the name is based.

It becomes therefore a matter of taste, and as I understand Mr. Cram and agree with him, the testimony of the usual École work shows very poor taste.

MR. COOLIDGE (J. R.) said that, among other products of the system of instruction at the École des Beaux-Arts, Mr. Cram found fault with the decorative plan, the plan shaped for its looks, designed, as he said, like a figure in a wall-paper. For his part he did not admit that the teachers at the École advocate the production of a decorative plan as an end in itself, but they do believe, and teach, that a well-studied plan which is but the simple readable expression of a definite architectural idea, will be found to be decorative, for are not such admirable plans as those of the Parthenon, Amiens Cathedral, St. Peter's (as Michael Angelo designed it), distinctly decorative?

In another direction, Mr. Cram failed to do justice to the methods of the École. He admitted that its system puts a check upon over-exuberant originality, but he did not perceive that the same system lends a confidence in one's powers that will encourage experiments in architectural design along the lines most promising for the development of the art.

The graduates of the École and of similar institutions throughout Europe have shown a praiseworthy readiness to make use of the architectural materials of the present age to create a style, characteristic of our time. If there is a style of the nineteenth century, it is the style evolved by the decorative use of iron and steel, and glass and clay products.

Since 1845–1850, the French, beginning with the Halles Centrales, have been elaborating an architectural style that is as much the outcome of its own period and of the attendant industrial and social conditions as are the French cathedrals of the thirteenth century. He hoped that the time was near at hand when trained men in this country would bring their contribution to the style that the trained architects of Continental Europe have been working out for nearly fifty years.

His last word on the question of École training was the answer that always rose to his lips when the method of the school or the character of the work of its graduates was called into question. Their work spoke for itself.

A large number of the most successful architects of America had received instruction either at the École or in the office of one of its most talented and lamented pupils. Whether their success had been achieved by the help of that training or in spite of it, he would leave his hearers to decide.

MR. H. L. WARREN said: — The interesting discussion we have had thus far, following upon Mr. Cram's entertaining paper, prompts me to make a few remarks, as it seems to me the two sides are not as far apart as at first blush they appear.

In the first place, let me say that while I sympathize — heartily sympathize — with what I believe is the underlying thought and drift of the paper, and while I welcome the considerations it has brought to our attention, yet it seems to me that the description of the methods and results of the training of the École des Beaux-Arts is clearly caricature — deliberate caricature. I think Mr. Cram would undoubtedly admit this himself, but that it was a caricature and so intended seems to have been overlooked by those who have replied to him. The purpose of a caricature is to call attention to certain faults or peculiarities by exaggerating them, so as to bring them into strong light. This Mr. Cram has very cleverly done. The excellences of the École des Beaux-Arts I think we all recognize. They are undoubted. These are, especially: the thorough training in the arrangement of the plan, in composition of plan and of mass, in the grouping and coördinating of the different parts of a building, in the careful study of the main masses of light and shade, and in proportion indeed Mr. Cram has clearly admitted this in his paper. All this the École does as perhaps it is not done in any other school in the world. They insist, too, on the same fundamental principles of design that obtain in Gothic architecture as in all good architecture: that the main facts of the plan must express themselves on the exterior, that there must be an organic relation of interior and exterior, that, in short, the exterior must be truly expressive. But while insisting on these principles up to a certain point, they stop short of the detail. With entire want of logic these principles, which they so strenuously insist upon, with regard to the larger features, are thrown to the winds the moment they reach the detail. If it is well placed, if the shadows are well proportioned, that is all they ask. The detail, they say with a shrug, is a mere matter of taste — a matter of bad taste usually. That the same principles which are applicable to the larger masses must be equally so to the details seems to me self-evident. No architectural feature is beautiful in itself merely, but because it is fit, suited to its position. Every moulding, every capital, every piece of carving on any structural feature should emphasize and express the function of the member to which it is applied. Only when this is the case with regard to every smallest detail, as well as with the larger features, can a work of architecture have that vital organic quality which alone can give it the entire unity of expression we require in a work of art. It is mainly in the poor taste of their decorative detail that it seems to me the French school fails. In its effect on taste, it seems to me the influence of the school is positively pernicious, and I always regret it

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when young students come under its influence before their taste is formed by the thorough study of what is best in the architecture of the past. This is, it seems to me especially to be regretted in the case of American students. We certainly do not want French taste, French ideas without regard to appropriateness or fitness, "crammed, — as Mr. Walker has said — down our throats by the enthusiasts of the Beaux-Arts Society," and I am glad to learn from what Mr. Walker has said, that this society — in its original spirit, at any rate — seems likely to fall apart, as it were, by its own weight. I always felt sure that it would do so, because its dogmas were distinctly out of place here in America. But then, the Beaux-Arts Society is not the École des Beaux-Arts, and the faults of its adherents are not all to be ascribed to the Paris school, but largely to a misunderstanding and misapplication of much of the French teaching. With all the faults of modern French architecture it must be said that it is, perhaps, the only living style of architecture existing in the modern world. With all its faults, it still is thoroughly expressive of French civilization, of French life, and the faults are those of French life and civilization. But just in so far as our ideals, our life, our civilization, our race, differs from that of France, French art is for us utterly inappropriate, and its imitation mere mimicry, which can lead to no good result. It has no place here. The curious and somewhat debased phase of "Classic" architecture now current in modern France is, after all, roughly speaking, only a development from the original French copy of an Italian Renaissance original, itself an imitation of the Roman style, which was largely a half understood imitation of late Greek work,— a reflection of a reflection of a reflection. It seems to me better for students to go back to the sources and to study the forms with which they have to deal in their origins, where the relation between structure and design is most clearly appreciated.

As Mr. Cram has referred with approbation to the school at Harvard, perhaps it may be well that I should say a few words as to our aims and ideals. We endeavor so far as possible to found our teaching of planning and composition on the methods of the École des Beaux-Arts; and we recognize that the study of planning lies at the foundation of all architectural study. Every trained architect recognizes the paramount importance of the plan. It is the only drawing that shows him his whole building, the only drawing that enables him to realize the composition of his design from every point-of-view. But while trying, so far as we may, to borrow what is best in the French methods, our purpose is to form the taste of the students by careful study of the best work of Greece, of Rome, of the Renaissance, and also of the Middle Ages. But the beautiful Gothic architecture is too complicated, and difficult of management for beginners, for it to be possible, even were it desirable, to make much use of its forms in practice in design. It is more remote from us to-day than the architecture of Greece and Rome; it is, as Mr. Cram has said, unfortunately an anachronism. But we do give a thorough study to its forms, especially with a view to understanding the underlying principles — principles which underly all good architecture, but are nowhere so completely manifested as they are in the best Gothic work.

Moreover, in a school of architecture, where the first essential is practice in design, it is necessary to acquire as soon as possible a working vocabulary of architectural forms, and this clearly can best be done by studying the few and simple, yet perfect, forms of the architecture of Greece, supplemented by the best Roman forms, and gradually enlarging the vocabulary by a careful study of the great works of the Renaissance, especially in Italy up to the death of Michael Angelo. In all cases we study what are recognized as the best works of these great times, and the taste of the student is formed upon these. As soon as familiarity with the general forms of the orders is acquired, they are further studied in their actual application in the great buildings of Greece and Rome rather than through the formulas of artists of the late Renaissance.

In selecting subjects for design we choose, as far as may be, problems from modern American conditions. But here, again, it is not possible at the outset to set before students — mere beginners — problems with which trained architects are wrestling not always with entire success. We must choose, rather, until a certain command has been attained, subjects more or less ideal in their nature, which will enable us to refer the student to definite precedent. When he is able with fair success to handle such themes, he may with advantage try his hand upon some of the problems for which less certain precedent is to be found. The value to the student of learning to handle monumental plans of some size seems to me undoubted, and its benefit will be felt when smaller problems are attacked. The training obtained in this way cannot be given, I think, by any other method. Some practice in picturesque planning should undoubtedly be given in order that the student may appreciate how far the methods of monumental work can here be applied, how far they have to be modified, and the requirements of good composition fulfilled by the use of somewhat different means, and here I may say that among our problems this year we intend to have a country church and a country house.

I shall be surprised if the essayist does not agree with me, that in some such way an architectural school should be conducted, and that sound architectural training must be founded upon a thorough knowledge of the orders and the simple details of Classic architecture. As I have pointed out, the École des Beaux-Arts in its instruction insists, up to a certain point, upon the same principles that Mr. Cram has advocated. The trouble is that it does not carry them far enough.

Mr. Ware said that, although Mr. Cram's paper was self-contradictory in parts, the caricature was none the less amusing and well done. He believed that, if the extravagances were elided and the remaining portions run together, it would be found that the reader had conceded to the Beaux-Arts system pretty-much all of the good qualities its most earnest advocates claimed for it. It seemed to him, however, that before making such a sweeping assault on the systems of education in vogue at the several American Schools of Architecture, a closer inquiry into the systems actually in use should have been made. He was reminded of the similar assault made on the American schools by the Committee of Education of the American Institute of Architects which, a few years ago, censured without stint those in charge of such schools because of their insufficient and inefficient methods of giving instruction in the history of architecture. Having laid their charge, the committee subsequently made inquiry, with the result that in the succeeding year it had to acknowledge it was largely in the wrong. In like manner, Mr. Cram probably was not aware that, at Cornell, Professor Babcock had given serious attention to giving instruction in Gothic architecture. He was particularly gratified that Mr. Cram acknowledged that one of the virtues of the Beaux-Arts system was that it did teach a sense of proportion, for he remembered that, long ago, in the Atelier Vaudremer nothing was so much insisted on as the study of proportion, sobriety and the absolute practicability of the plan.

Mr. J. W. Fosdick, a guest, who had somewhat misconceived the temper of the discussion, said a few words tending to harmonize what he conceived to be radically conflicting views.

Mr. Brown furnished an account of a concrete instance where a young American architect, fresh from the Beaux-Arts *ateliers*, found himself quite disqualified to meet the positive requirements of his first client, who desired him to adopt the picturesque treatment shown in certain photographs of an old half-timbered English inn, and refused to be satisfied with a design where the parts were academically balanced and all features adjusted to their appropriate axes.

Mr. Cram, in conclusion, said that although he had, in a spirit of caricature, used broad strokes and strong colors, yet the elements of his criticism were strongly rooted in his own mind as realities. He regretted that at this meeting he had to appear in the garb of a mere iconoclast, but there was not enough of the evening left for him to qualify his destructive criticisms by making those constructive recommendations he intended to make when he began to write his paper, and he felt all the more strongly the need of making such qualifications since he had heard the remarks of the other speakers. He entertained very strong convictions on the subject of architectural education, and trusted the Society would be willing, at a later date, to listen with as kindly courtesy to another paper in which he hoped to embody his recommendations. Before, however, he could venture to do this, he now felt the need of prosecuting closer inquiries into the methods followed in several of the architectural schools of which he had at present no personal knowledge.

BOOKS AND PAPERS

The publishers of the "*Bibliothèque des Arts Décoratifs*" have done a very useful thing in bringing together in a separate publication the scattered papers by Professor Jules Passepont that have appeared from time to time in the *Revue des Arts Décoratifs*.

As we translated and republished in this journal a few years ago the papers that deal with "dolphins," "bucrania" and "scales and imbrication," our readers must be familiar with the general character of the papers that are now brought together. In addition to the papers we have already published, this new volume of the "*Bibliothèque des Arts Décoratifs*" contains further papers on "Garlands," the "Greek Fret," and the "Greek Wave Ornament," each paper being as profusely and intelligently illustrated as were the earlier papers which we translated. As the book contains more than six hundred cuts, and as these cuts exhibit the graces, complications and manifold varieties of the several decorative forms to which each paper is devoted, it is useful and very well worth the price even to those who do not read French with great facility.

BOOKS RECEIVED.

"*John Wellborn Root*": A Study of his Life and Work. By Harriet Monroe. With etchings and drawings by Charles F. Mielatz and fac-similes of designs by Mr. Root. Boston and New York: Houghton, Mifflin & Co. 1896. Large 8vo. Price, $6.

[1] "*Etude des Ornements*," par Jules Passepont, professeur à l'École régionale des Arts et à l'École pratique d'Industrie de Saint-Étienne. — Un volume in-8° colombier, illustré de 651 gravures dans le texte et une planche hors texte. — Prix, broché, 10 francs. Paris, librairie Rouam, G. d'Hostingue, direct., 14, rue du Helder.

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"*The Architecture of the Renaissance in Italy*": A General View for the Use of Students and others. By William J. Anderson, Architect, A. R. I. B. A.; Director of Architecture, and Lecturer at the Glasgow School of Art. With fifty-four collotype and other plates, and seventy-four smaller illustrations in the text. London: B. T. Batsford. 1896. 8vo. Price, 12*s.*, 6*d.*, plus charges.

"*Modern Carpentry and Building.*" By W. A. Sylvester. Boston: Allen Sylvester. 1896. Price, $2.

"*Der gute Geschmack*": Æsthetische Essays. von Lothar Abel, Architekt, Ritter des Kaiserl, Osterr. Franz Josef-Ordens; Besitzer der Kaiserl, Osterr. Medaille für Kunst und Wissenschaft, etc. Mit 129 Abbildungen. Vienna: A. Hartleben's Verlag. 1895.

SOCIETIES

T-SQUARE CLUB.

AT a special meeting of the Executive Committee of the T-Square Club, held at the office of the President, Mr. David Knickerbacker Boyd, the following resolution was adopted:

Whereas, The public-spirited citizens of the State of California have determined to erect a series of new buildings for the University of California, upon an unexcelled site, overlooking the Golden Gate and the City of San Francisco, and

Whereas, The Regents of the aforesaid University are now receiving suggestions from various members of the architectural profession, and from many architectural societies, in regard to the best method of framing the conditions for competition to secure plans for their proposed buildings,

Be it Resolved, That the Executive Committee of the T-Square Club of Philadelphia, the foremost architectural organization of Pennsylvania, recommend,

First, That the competition be restricted to architects of recognized ability of the United States, as, by so doing, we believe that more successful results will be obtained, inasmuch as they are familiar with the exigencies of American civilization, education, and climate.

Second, That a small committee of the representative architects be invited to confer with the Regents of the University of California, visit the proposed site, and prepare the programme for the competition.

Third, That this same Committee of Architects be empowered to invite a certain number of additional members of the profession to enter with them into a paid competition.

And finally, We believe that a restricted, paid competition will elicit more carefully studied designs, and a stronger representation of leading architects than any form of open competition.

CHARLES E. OELSCHLAGER, *Secretary.*

PITTSBURGH ARCHITECTS' CLUB.

AN Architects' Club was organized this month at a meeting held in the Carnegie Library Building under the auspices of the Academy of Science and Art. The object of the organization is to promote better architectural work, and some of the most prominent architects in the city are interested in the movement. Meetings are to be held every two weeks, and each month there will be competitive drawings on a subject submitted by the members of the Club to a board of judges. Librarian Anderson is much interested in the Club, and will give it every assistance in his power. The new body will be known as the Pittsburgh Architects' Club.

NATIONAL SOCIETY OF MURAL PAINTERS.

THE annual election of the National Society of Mural Painters was held at their last meeting, and the following officers elected for the year 1896–1897:

Honorable President, John Lafarge; *First Vice-President*, Frederic Crowninshield; *Second Vice-President*, Geo. W. Maynard; *Treasurer*, D. M. Armstrong; *Corresponding Secretary*, Chas. M. Shean; *Recording Secretary*, Chas. R. Lamb.

The election took place at the regular meeting of the Society, held in the studio of the First Vice-President, Mr. Frederic Crowninshield, 42 West 18th Street, New York.

At this meeting was exhibited the entire series of drawings submitted in the limited competition for the important memorial stained-glass windows to be erected in the new City-hall, Paterson, N. J. This competition has but recently been decided by an expert jury who acted upon the request of the architects, Messrs. Carrère & Hastings. Each competitor was paid for his design, the winner, Mr. Schladermundt, being given the execution of the work.

MICHIGAN'S BOARD OF HEALTH A MONEY-SAVER.—No other branch of State business seems to be making the clean cash that the State Board of Health is realizing. According to a report just issued by the Secretary, the Board saved to the people of Michigan in the last five years $5,097,800. It did this by preventing 112,843 cases of sickness, and 5,261 deaths from diphtheria, scarlet fever, typhoid fever and measles. If the Secretary will now ascertain the names of the people the Board saved from illness and the grave, and collect the five millions from them for valuable services rendered, he will be able to balance his books and give the State a lift with some ready money.— *Detroit Free Press.*

ILLUSTRATIONS

[*Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.*]

HOUSE OF MRS. BARBARA ARMOUR, 117 LAKE SHORE DRIVE, CHICAGO, ILL. MR. FRANCIS M. WHITEHOUSE, ARCHITECT, CHICAGO, ILL.

[Gelatine Print, issued with the International and Imperial Editions only.]

SUMMER RESIDENCE OF E. C. BENEDICT, ESQ., INDIAN HARBOR, GREENWICH, CONN. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

[Gelatine print, issued with the International and Imperial Editions only.]

THIS view is the first of a series which will exhibit in detail the very interesting way in which a country place has been created on the somewhat barren site formerly occupied by Indian Harbor Hotel, once in the occupancy of the Americus Club, of Tammany fame. The buildings are of brick covered with a stucco of marble-dust and cement.

SOUTHWEST VIEW OF THE SAME HOUSE, SHOWING SERVICE BUILDING ON THE LEFT.

PLAN OF ESTATE OF E. C. BENEDICT, ESQ., INDIAN HARBOR, GREENWICH, CONN. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS; MESSRS. OLMSTED, OLMSTED & ELIOT, LANDSCAPE ARCHITECTS.

THE quite accidental publication of this drawing in the same issue with the discussion on the utility of certain Beaux-Arts practices, may be taken as showing that even in America elaborately rendered plans are made, and have a usefulness for both client and architect. Apropos of this very point, Mr. Hastings speaks in *Garden and Forest* in the following words:

"A good plan of house and grounds, as seen on paper, aside from the questions of arrangement, has proportion, form, scale, color, values and character. The drawing of such a plan will awaken as much enthusiasm in the educated architect as does the picture in the painter or the statue in the sculptor. This plan should be thoroughly studied and practically finished before the architect has more than a vague idea of the design of the exterior of the building. The plan involves and determines the entire composition; the silhouette or outline of the whole is really projected on the plane of this drawing. If the relations to each other of roads, paths, buildings and other features are well studied and look well on paper, they are almost sure to prove successful when seen in perspective after the work is completed. Such a comprehensive plan does away with the necessity of perspective drawing as a help to architectural as well as landscape study, and leaves it no place except to explain a building to a layman. The many elevations of the several buildings on Mr. Benedict's place have been evolved from the general scheme, and are the natural expression of the whole plan. No one elevation of the houses would give any idea of the entire scheme, as the greatest interest centres in the general composition of the grounds and relations of the buildings to one another, or what the French call the "*plan général.*" They have a very characteristic name for this portion of the composition, which is the "sauce of the architecture." It is this portion of the design which unites or marries the building with its natural surroundings. Most of the same principles of composition obtain in the planning of this portion of the work as in the planning of all the buildings themselves. The silhouette must make first of all an agreeable *ensemble* with the silhouette of the buildings."

A RELIC OF THE TUILERIES, PARIS, FRANCE.

CHURCH OF ST. RONAN, LOCRONAN, FRANCE.

THIS fifteenth-century church in a little far western town in Brittany is the objective point of one of the great pilgrimages that annually take place in different parts of France. It is a matter of good fortune that the modern lantern that surmounts the great tower is nearly obscured from view.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXIX: THE WELL OF ST. PATRICK, ORVIETO, ITALY. ANTONIO DE SANGALLO, ARCHITECT.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XL: BASIN OF THE CASCADE IN THE PARK AT FONTAINEBLEAU, FRANCE.

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REDOUTE BUILDING, BUDA-PESTH, HUNGARY. — NATIONAL BANK, ANTWERP, BELGIUM.

[Additional Illustrations in the International Edition.]

SOUTHEAST VIEW OF HOUSE OF E. C. BENEDICT, ESQ., INDIAN HARBOR, GREENWICH, CONN. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

WEST PORCH OF SAME HOUSE.

[Gelatine Print.]

OFFICES OF THE ST. GILES BOARD OF WORKS, HOLBORN, LONDON, ENG. MR. W. RUSHWORTH, ARCHITECT.

BALL-ROOM DOOR: NORFOLK HOUSE, ST. JAMES SQUARE, LONDON, ENG.

The architect of Norfolk House itself, which was begun in 1742, was Matthew Brettingham.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A CORRECTION: "STATICS OF STRUCTURES."

To the Editors of the American Architect: —

Dear Sirs, — I beg to offer a few remarks on "Statics of Structures," commencing in your issue of December 5th. Such articles must necessarily be considered as self-helps for students, and, therefore, should be written in as simple a form as possible; and to this end letters, so far as possible, should always represent the same units.

In Section 10, in the equation $pl=P$ lbs., and in Section 25, $M=\frac{P\,l}{8}$, P has not the same value in each, but the P in the second case is, obviously, 12 times greater than the P in the first formula, because p is in pounds per *foot* and l is length in *feet* in the first case, which is correct; but p is in pounds per *foot* and l is length in *inches* in the second case, which is an error. The same error runs through all the formulas, from Section 16 to Section 25, inclusive.

The weight p should be in pounds per *inch* when the length of beam is expressed in *inches;* the weight p should be in pounds per *foot* when the length of beam is expressed in *feet;* p in pounds per *yard* when length of beam is in *yards;* that is, the same units must be employed in each case, and, to avoid confusion in the student's mind, these units, when once fixed, should remain the same throughout the work. At least, this is the way these things appear to a student. Respectfully, N. Wardrop.

New York, December 18, 1896.

To the Editors of the American Architect: —

Dear Sirs, — In reply to the foregoing letter of Mr. Wardrop's, I wish to say that his criticism with regard to using one symbol for two denominations is justified by my last remark in Section 18, to the effect that "in all these equations P is the load in pounds per *foot*, while l is the span in *inches*, so that M is expressed in inch-pounds."

This statement is an error on my part; it ought to be omitted and l allowed to signify span in *feet* down to Equation 6. The l occurring in this equation being the length of the lever arm, and entirely independent of the l in $pl=P$, can then be taken in feet or in inches, giving M in foot or inch pounds, whichever may be better suited to the case under consideration.

Both will give the same value, although a moment in inch-pounds is evidently (numerically) twelve times as great as the same moment in foot-pounds. I am greatly indebted to Mr. Wardrop for calling attention to the error.

Yours respectfully, O. F. Semsch.

NOTES AND CLIPPINGS

Typhoid Fever and River Water. — Munich and Vienna, supplied with mountain water, average only 7 deaths from typhoid to 100,000 of the population. In New York the figure is 20, while in Pittsburgh and Louisville, which use river water, it is as high as 77.—*N. Y. Evening Post.*

A Portrait of Gilbert Stuart for the National Gallery. — The National Gallery has purchased the portrait, by himself, of Gilbert Stuart, the painter of portraits of Washington and other notable Americans of the time of the Revolution.

The Artist Ziem's Queer Home. — Amusing stories are told of Ziem, who lived in a house at the top of the Rue Lepic on Montmartre. His house was his castle in the literal sense of the word. It was difficult to obtain admission, for the painter had an upper window out of which he always looked when the bell rang, and interrogated his would-be visitors. He had a basket which he let down by a cord to receive packages or messages, and he slept in a wonderful swinging-bed. His house was a veritable museum, illuminated Persian manuscripts being part of his collection. Some of these were worth thousands of francs, but it was impossible to persuade him to sell any of them. In place of a newel-post on his stairways stood the prow of a gilded gondola, and, closely immured in his studio, he painted pictures of Venice, and bade defiance to all who came to disturb his peace. — "*Souvenirs of a Veteran Collector,*" *December Century.*

The Passing of the Intramural Burying-place. — The intramural place of burial has only a limited term: it is dug up after a while, the duration of its immunity depending upon circumstances. When the spaces occupied by them are much wanted, their old tenants are extruded with little ceremony. One after another they have disappeared from the city limits, the living usurping the roods which the dead strove vainly to hold in mortmain. The passing of the old St. John's Cemetery in Hudson Street is only one in a procession of such, following each other since the city was founded. No interments have taken place in it for half a century, and there are few left to repine that the space is now to be handed over to the uses of the living. A pretty park will soon spread there its summer leafing and blossoming, and the gloom of the place of graves will give place to the brightness of a garden of pleasure. It will ornament that part of the city in perpetuity, and there is no reason to apprehend that the ghosts of its old tenants will haunt it for any great length of time. — *New York Tribune.*

Longevity as affected by Position of Sleeping Place. — A report has been published of the investigations made by M. Korosi, a Hungarian hygienist, on the effect of living in cellars and on ground and upper floors upon the duration of life. Summarizing this report, the *National Popular Review* states that Korosi found that the dwellers in cellars averaged a life of about thirty-nine years and eleven months; those on the ground floor forty-three years and three months; those on the first and second floors forty-four years and two months; while those on the third and fourth floors lived to only forty-two years. All things being otherwise equal, it is considered that these observations may be accepted as showing the different effects upon longevity by the different planes of residence. Thus, the air of cellars or basements is never healthy, nor can such localities be suitably ventilated without considerable cost, the occupants being exposed to ground-moisture contaminations, to the impurities of body exhalations and to foulness of the heavier ground air from the street and yard that of necessity pours down into such spaces. Those living on the first and second floors seem to enjoy the longest lease of life, as might be expected, in view of the greater freedom of such floors from foul gases, microbes and germs, animal emanations and from street dust.

L'Union Centrale des Arts Decoratifs. — In the history of museums, whenever it is written, there will be no chapter more strange than that relating to L'Union Centrale des Arts Décoratifs. France is rich in museums, and in England we have taken many a lesson from them. But it was supposed the South Kensington Museum was inspired by an original idea, and there was a resolve to create one of a similar kind in Paris. In that way the Union was formed. The members were to contribute money or examples of art, or in some other way endeavor to realize the profit. It was not long before a useful collection of objects was formed. A room to contain them was found in the Palais de l'Industrie, and country folks imagined it was a sort of supplement to the *Salon* exhibitions. As the prospects were encouraging permission was obtained to have a lottery in order to raise funds. It was a marvellous success. The prizes were magnificent, but after paying them it was supposed that about half a million sterling remained. Having so much money, it was resolved to obtain a museum. Application was made for the ruined Cour des Comptes, which the Government were willing to grant to the Union. The position was convenient for amateurs, but it was far removed from the places where designers and craftsmen lived. The managers of the Union would not listen to remonstrances; they had resolved on the Cour des Comptes, and there the collections must go, or the Union would be dissolved. The trade representatives were forced to yield. Then began a series of scenes of coquetry without parallel. All the arrangements for transferring the property were concluded and the deeds prepared, but the authorities of the Union unexpectedly became shy, and would not sign. The more the Government officials pleaded to have the affair settled, the less willing was the Union to become a contracting party. The aim was to compel the Government to pay all expenses for converting the ruins into a museum, but the diplomacy was so unwisely conducted that the Government abandoned the affair. The prestige of the Union vanished. In vain an annual prize was offered for an example of decoration; practical designers left the competition to children. The exhibition was so rarely visited, it is doubtful whether enough francs were received to pay the attendant at the turnstiles. The impending demolition of the Palais de l'Industrie has made it necessary for the Union to seek other quarters. The collections are to be placed in the Pavillon Marsan, a corner of the Louvre which is the most remote from the part containing the galleries of art. It is needless to say they will not be visited, and their entombment seems to be the inevitable end of a project that was badly managed during the last few years.—*The Architect.*

S. J. Parkhill & Co., Printers, Boston, U. S. A.

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THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 172. SATURDAY, OCTOBER 3, 1896. VOLUME LIV. No. 1084.

THE KELLY WASH-BASIN.

THE Kelly Safety Sanitary Syphon Wash-basin cannot overflow, cannot become clogged or stopped up (in ordinary use) in basin or trap. Sand, dirt, etc., thrown in as tests with the plug in the basin, are syphoned out completely. There is not one-half inch of fouling space in the basin. In this basin the overflow is in the bottom above the plug, and is therefore trapped while there is any water in the bowl. To empty the water in the bowl it is not necessary to keep the plug out until all the water discharges. By lifting the plug and letting it drop back to its place, the water rushes out through the overflow, which enters the waste-pipe below the plug. Should the plug be held out until all the water is discharged, a great portion of this water finds its way out by the overflow. Tne contents of the basin cannot be discharged without flushing the overflow. Should the plug be left in and the cocks left open, instead of overflowing on the floor, a periodical flush is secured. The overflow is as large as the waste-pipe. On account of the syphonic action, this bowl will empty one-third quicker than any old-style bowl.

In private residences, during the absence of the family, the waste-pipe trap is not depended upon to bar out sewer-gas, for the plug can be placed in the basin, and the basin filled to any point desired, and when the water in the trap evaporates (which occurs in less than ten days) you have a large seal of water in the basin, which will last longer than any family is apt to be gone from home. The syphonic action prevents the waste-pipe getting stopped up, as it cleans out matter — such as hair, lint and matches, which are the general causes of stopping up of ordinary basins.

Use plain "S" or "P" traps. No mechanical traps.

This is the only basin on the market in which the dirt is washed out of the basin as fast as it is deposited. By allowing a small stream to run continuously, a clean basin and body of water is insured.

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GATES AND FENCES.

THE increasing popularity and demand for Ornamental Gates and Fences has caused us to issue a little brochure, with the double object of interesting those who have not as yet considered this subject, and of assisting others, who, already having given the matter some thought, are at a loss to know where to turn for the practical and artistic fulfilment of their ideas.

The high standing we have attained among the leading architects of this country, not only in the character of work with which this booklet deals, but also in all other classes of ornamental iron, warrants, we believe, your consideration, if this subject appeals to you at all, and if you desire the best that a thorough knowledge of this business and a constant striving toward higher standards can give you.

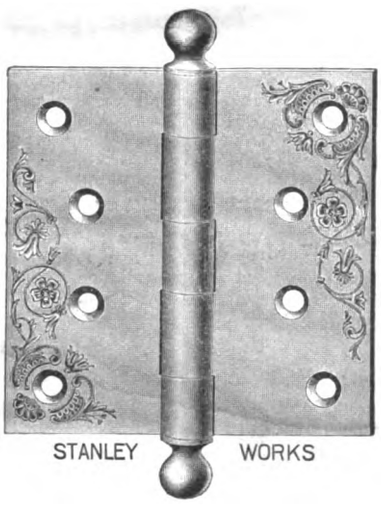
Our work is made entirely from special and original designs, actuated by a constant regard for harmony with surrounding conditions, and with a thorough consideration of its artistic and practical value.

It will give us pleasure to forward to any inquirer a copy of this little publication.

THE WINSLOW BROS. COMPANY,
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WROUGHT STEEL LOOSE PIN BUTTS.

IN the Butt shown by the annexed cut, the ornamentation stands out in relief, it being



The Butt is of wrought-steel with ball tips and loose joints.

raised above the surface of the butt and made still more prominent by the shading of the finish. It is a very handsome butt.

THE STANLEY WORKS,
NEW BRITAIN, CONN.

THE WORTHINGTON AUTOMATIC FEED PUMP AND RECEIVER.

(PATENTS PENDING.)

IN factories, hotels and apartment-houses, or in any building where steam is used for heating purposes, it is always desirable and generally necessary to provide an apparatus for draining the radiators, coils and steam-pipes, and also to feed automatically to the boilers the water of condensation while it is in the hottest condition.

The absence of a suitable arrangement of this kind is often the cause of the disagreeable snapping and hammering sound in radiators and steam-pipes, which, particularly in hotels and apartment-houses, it is important to avoid. In manufacturing establishments, the addition of such an apparatus is not only a source of economy in coal consumption, but it increases the efficiency of the heating plant.

The Worthington Automatic Feed Pump and Receiver was designed to meet the several requirements of this service with the simplest and least complicated form of construction. This machine combines simplicity of construction with such improvements as especially fit it to the best modern practice in steam-heating and circulation.

The space it occupies is small, and it is sufficiently low to permit the complete drainage of even the lowest line of pipe in a steam-heating system, the bottom of the tank being on a level with the floor. This gives the Worthington apparatus a great advantage over other devices for draining steam-pipes.

The operation of the Worthington Automatic Feed Pump and Receiver may be briefly described as follows: The supply of steam which operates the pump is controlled by a valve and float in the receiver. As water of condensation from the coils is returned and falls into the receiver the float rises, and, acting upon the valve, causes it to admit steam to the pump. The latter at once feeds this hot water of condensation to the boiler without allowing it to cool. The fall of the water-level in the receiver lowers the float and lessens the speed of the pump. So at all times the action of the pump is to automatically supply to the boiler whatever water enters the receiver.

The receiver rests on a solid base or bed-plate, which also supports the pump. The connections and fittings furnished with the machine consist of suction and steam-pipes from pump to receiver, and a gauge-glass. The latter, however, is not a necessary attachment to the receiver, as it is impossible for the water-level to fall below the level to which the governing appliance adjusts it. The pump is the Worthington Regular Pattern. The Low Steam Pressure Pump can be used in places where it is necessary to carry steam at low pressure, the extra expense of the change being inconsiderable.

HERNY R. WORTHINGTON,
NEW YORK, N. Y.

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FIRE NOTICE!

THE offices of the Colliery Engineer Company, proprietors of *The Colliery Engineer and Metal Miner*, *Home Study*, and the International Correspondence Schools, in the Coal Exchange Building, Scranton, Pa., were partially destroyed by fire on Sunday morning, August 30, 1896.

Fortunately, our printing plant was in another building, and we had reserves of all Instruction and Question Papers, Drawing-plates and other supplies and stationery used in the schools in still another building, so that our business will not be seriously interfered with.

The Colliery Engineer and Metal Miner and *Home Study* will be out within a few days of the usual time, and we are already (September 2, 1896) conducting the instruction in our schools as usual.

We have secured quarters on the three upper floors of the new Mears Building, corner of Washington Avenue and Spruce Street, Scranton, and are now prepared to enter new subscriptions to our publications and also to enroll and commence promptly the instruction of new students in our Schools, as before the fire.

Our new offices are even more convenient and commodious than those which we have been compelled by the fire to leave, and we expect to occupy them until the completion of our own buildings, now being erected on Wyoming Avenue.

Patrons of our publications and students of the schools visiting Scranton are invited to call upon us in our new quarters.

Respectfully,

THE COLLIERY ENGINEER CO.,
SCRANTON, PA.

THE CUTLER PATENT MAILING SYSTEM,

OR United States Mail Chute, has become a necessity in office-buildings, hotels and apartment-houses. Installed in such buildings under explicit authorization and a special order of the Postmaster-General, making the mail chute a part of the receiving-box, etc.

It provides for the mailing of letters in each story and is available not only for correspondence but for the service of legal papers which can be mailed. Limited in its use to such structures as are arranged to comply with the necessarily stringent regulations of the Post-office Department, and in locations where the additional collections are possible with the carriers available, the system can be offered only subject to official approval. It may be said to have revolutionized the collection service, as it is in general use in nearly one thousand buildings in more than one hundred cities of the United States, and in the City of New York alone in about one hundred buildings. The elevator made high buildings possible — the Cutler Patent Mailing System has enabled the Post-office Department to collect their mail. It is made under the Cutler series of patents exclusively by

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MESSRS. SARGENT & CO., of New Haven, Conn., have issued a very ingenious circular, wherein, by a process of manifolding, they show the workings of one of their locks for interior doors. By folding one part of the circular over another, a very clear exposition is presented of the working of the several parts while the knob is being turned.

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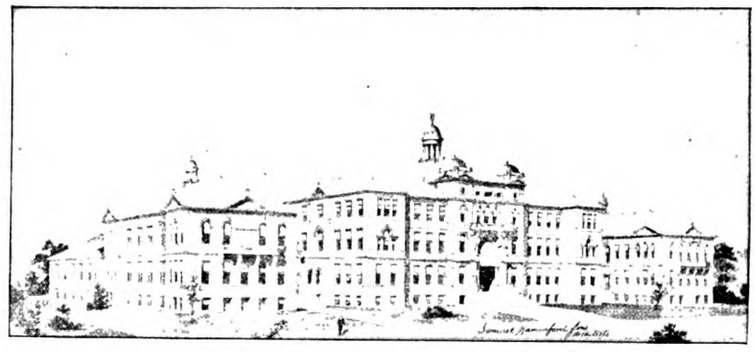
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The assertion that the *American Architect* is a paper whose characteristics are *national* and not merely local is supported by the following table, which exhibits the manner in which several journals have treated domestic architecture. In this comparison the IMPERIAL edition of the *American Architect* is considered, since the additional plates of the INTERNATIONAL edition are, in the main, illustrations of foreign work.

PAPER.	Number of subjects contributed.	Number of contributing architects.	Towns in which contributors were established.	States in which contributors were established.
No. I. . . .	214	109	28	16
No. II. . .	137	78	21	15
No. III. . .	118	56	16	11
Am. Architect.	267	152	47	24

In the first column, "subjects," only actual domestic work is included (foreign work, imaginative designs and the work of sketch-clubs are excluded), and the figures there given indicate that this number of designs might have been prepared by the same number of architects practising in the same number of different towns. The remaining columns show how nearly this ideal distribution has been reached in each case.

Architects practising in the State of publication furnished.				
Subjects.	Per cent of total number of subjects.	Different architects contributing.	Per cent of total number contributing architects.	Towns.
161	.752	75	.688	7
46	.335	24	.307	2
70	.593	22	.392	1
73	.273	39	.256	3

From this table it appears that Massachusetts architects — .256 per cent of the total number of contributors — provided only .273 per cent of the total number of designs published, percentages which, in view of the fact that Massachusetts is one of the most populous States in the Union, prove that they have not been accorded an unreasonable amount of our limited space.

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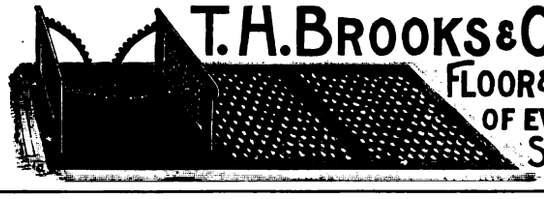
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I value the "American Architect" and prefer to carry it.
J. G. HASKELL, Architect.

Passaic, N. J., Dec. 18, 1893.
I find that there is no economy in subscribing to the cheaper edition, and that the highest-priced one [the International] is really the cheapest.
W. M. MEEKER.

Columbia, S. C., Dec. 15, 1893.
I find it too valuable and have derived too many benefits from it to part company.
FRANK NIERNSEE, Architect.

Cleveland, O., Dec. 7, 1893.
We shall do all in our power to assist in the continuance of the publication of the American Architect.
LEHMAN & SCHMITT, Architects.

Masonry in Modern Work.

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 173. SATURDAY, NOVEMBER 7, 1896. Volume LIV. No. 1089.

AN INTERESTING STUDY IN THE DISINTEGRATION OF BRICKS.

We publish below three illustrations showing climatic effects on brick walls that were built of very poor and porous bricks, such as are found among the common bricks made in many parts of the country, and which become quickly saturated with water during storms which, freezing and thawing with the changes of temperature, crack and chip the surface of the brick to an extent hardly appreciated by those familiar only with our more dense and compact bricks.

That it is possible to preserve the surface of such a wall would seem to be demonstrated by the results shown in the accompanying illustrations.

Figure 1 shows the cracked and chipped condition of a wall at the northeast corner of a house on Howe Street, Vancouver, built four years ago.



Fig. 1.

Figure 2 shows the condition of a wall at the northeast corner of a house on Granville Street, Vancouver, which had been covered with tar eighteen months.

Figure 3 shows the condition of a wall at the northeast corner of the Metropolitan Club Building at Vancouver, which was covered four years ago with Cabot's Brick Preservative. — *The Brickbuilder.*

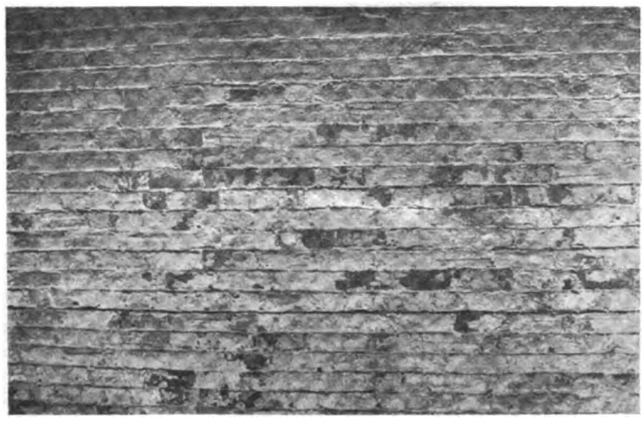


Fig. 2.

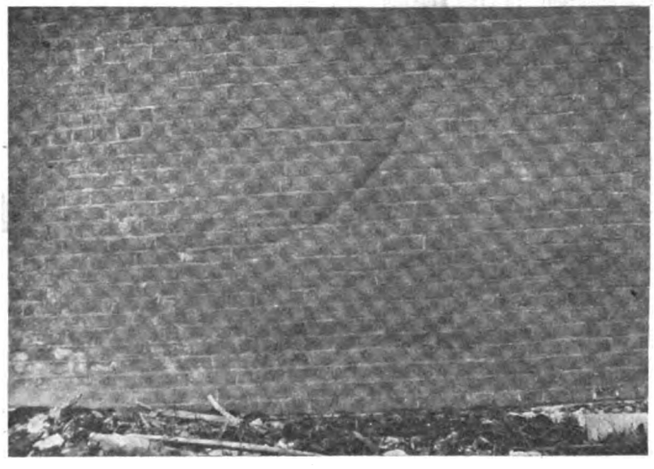


Fig. 3.

HINTS TO FITTERS.

To insure the successful working of a steam or hot-water heating plant, it is necessary to properly plan and erect the apparatus.

Herewith we have presented a few general directions to guide the fitter, and have endeavored to make them so explicit that any good mechanic familiar with piping can put the system in without fear of failure.

This data has been verified by our own experience in planning hundreds of plants each year in all kinds of buildings, and the experience of the leading heating engineers of this country and Canada.

Should any party desire more detailed information, we will take pleasure in answering their inquiries to the best of our ability and when our heaters are used, if desired, we furnish estimates, and full and clear working-drawings of the piping, without charge.

STEAM-HEATING.

In planning a low-pressure steam-heating apparatus, the steam-fitter can choose between several different systems, any of which, if properly erected, will give satisfactory results. His choice should depend upon the special conditions and requirements governing the plant under consideration. The systems of piping in common use and generally considered to be good practice, are the two-pipe system with wet returns; the two-pipe system with dry returns; the one-pipe system, all mains, branches and risers being relieved into a return main below the water-line; and the continuous or one-pipe circuit system, all piping being above the water-line.

We have illustrated the two-pipe system with wet returns, and the one-pipe circuit system. Either one of these systems, with perhaps slight modification, can be adapted to almost any low-pressure steam-heating problem.

RADIATION.

To determine the amount of radiating-surface necessary for any given heating-apparatus and to proportion it properly, requires the best judgment of the engineer. A number of rules for estimating the amount of radiation are given by different authorities, dependent on the glass and wall exposure and cubic contents. As it is not always possible to have this data at hand, a convenient factor for rough calculations is the cubic feet of space. Under ordinary conditions, one square foot of direct radiating-surface will heat approximately in:

Bath-room, living-room, with two or three exposures, and large amount of glass ..	40 cu. ft.
Living-room, one or two exposures with large amount of glass.....	50 " "
Living-room, one exposure, ordinary amount of glass.....	60 " "

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Sleeping-rooms	55 to	70	cu. ft.
Halls	50 "	70	" "
School-rooms	60 "	80	" "
Churches and auditoriums of large cubic contents and high ceilings	63 "	100	" "
Lofts, workshops and factories	75 "	150	" "

If indirect radiators are used, allow not less than 50 per cent more surface than for direct, and for direct-indirect 25 per cent more.

In estimating the radiating surface make due allowance for exposure of building, material of construction, location, length and size of main, location and capacity of boiler, also loose construction of doors and windows.

BOILER.

Having ascertained the amount of radiation, select a boiler of ample capacity to carry the radiation and mains, allowing, if possible, a reserve of from 20 to 25 per cent; as a large boiler can be operated with less attention and greater economy of fuel.

In determining the size of boiler, be governed by the exposures and cubic contents and not always by the radiation, as this may have been figured too small. Also allow for distance radiators are located from boiler, size of flue, draught, kind of fuel to be used and probable management.

RADIATORS.

The most common form of direct-heating surface is the ornamental loop cast-iron radiator. These are made in a great variety of styles and designs, and in shapes to suit almost every requirement. If a radiator is selected that is short of prime surface as rated by the manufacturer, make due allowance.

Direct radiators should be tapped as follows:

TWO-PIPE WORK.

Less	than	30	square feet	$\frac{3}{4}$ x $\frac{3}{4}$	inch.
From	30 to	50	" "	1 x $\frac{3}{4}$	"
"	50 to	100	" "	1$\frac{1}{2}$ x 1	"
"	100 to	160	" "	1$\frac{1}{2}$ x 1$\frac{1}{2}$	"

ONE-PIPE WORK.

Less	than	25	square feet	1	inch.
From	25 to	50	" "	1$\frac{1}{4}$	"
"	50 to	90	" "	1$\frac{1}{2}$	"
"	90 to	160	" "	2	"

INDIRECT RADIATORS.

Less	than	30	square feet	1 x $\frac{3}{4}$	inch.
From	30 to	50	" "	1$\frac{1}{2}$ x 1	"
"	50 to	100	" "	1$\frac{1}{2}$ x 1$\frac{1}{2}$	"
"	100 to	160	" "	2 x 1$\frac{1}{2}$	"

SUGGESTIONS IN PIPING.

In a low-pressure gravity return steam-heating apparatus, the steam and water-of-condensation in the mains and radiators should both flow, so far as is practicable, in the same direction; there should be a uniform, continuous and noiseless delivery of steam throughout the mains to each and every radiator or coil; the water-of-condensation should be returned to the boiler steadily and noiselessly by gravity, and all air should be expelled freely from the system. The arrangement and proper erection of the mains, branches and risers to accomplish this at any and all pressures that come within the scope of a low-pressure apparatus, is one of the most important problems of the heating engineer, and upon this depends largely the successful working of the apparatus.

The boiler should be located in the basement at lowest level possible, near the centre of the system and convenient to chimney. Chimney to be of ample height and area to insure a good draught. A square or round chimney will give the best results, and it should have an area of not less than 25 to 30 square inches for every square foot of grate-surface; never connect a boiler to a chimney having less than 8″ x 8″ inside dimensions.

Start with main steam-pipe from top of boiler, rising vertically as high as may be convenient, so that its level may be as far above the water-line as possible. This distance from water-line to level of main should not be less than 24 inches.

If a valve is required upon the main at the boiler, it should be placed at the highest point, so that condensation may not find lodgement on either of its sides.

From the highest point, directly over boiler, pitch the main steam-pipe down as it recedes from boiler about one inch in ten feet, and in two-pipe work the return main should be pitched toward the boiler at about the same incline.

The fitter should ever have in mind the thorough drainage of the steam-pipes as a means of preventing all cracking or pounding noises; avoid the use of any fittings or connections which will admit of the lodgement of water.

To determine the size of pipes no fixed rule can be given which will apply in all cases. A rule that has generally been accepted by steam-fitters as good practice, is to allow the area of a one-inch pipe (.7854 square inches) for every 100 square feet of radiating-surface, including mains.

LIST OF SIZES OF STEAM MAINS.

Radiation.			One-pipe work.	Two-pipe work.
40 to	50	square feet	1 inch	$\frac{3}{4}$ x $\frac{3}{4}$ inch.
100 "	125	" "	1$\frac{1}{4}$ "	1 x $\frac{3}{4}$ "
125 "	250	" "	1$\frac{1}{2}$ "	1$\frac{1}{4}$ x 1 "
250 "	400	" "	2 "	1$\frac{1}{2}$ x 1$\frac{1}{4}$ "
400 "	650	" "	2$\frac{1}{2}$ "	2 x 1$\frac{1}{2}$ "
650 "	900	" "	3 "	2$\frac{1}{2}$ x 2 "
900 "	1,250	" "	3$\frac{1}{2}$ "	3 x 2$\frac{1}{2}$ "
1,250 "	1,600	" "	4 "	3$\frac{1}{2}$ x 3 "
1,600 "	2,050	" "	4$\frac{1}{2}$ "	4 x 3$\frac{1}{2}$ "
2,050 "	2,500	" "	5 "	4$\frac{1}{2}$ x 4 "
2,500 "	3,600	" "	6 "	5 x 4$\frac{1}{2}$ "
3,600 "	5,000	" "	7 "	6 x 5 "
5,000 "	6,500	" "	8 "	7 x 6 "
6,500 "	8,100	" "	9 "	8 x 6 "
8,100 "	10,000	" "	10 "	9 x 6 "

In determining the size of main the steam-fitter should have in mind the conditions governing the plant under consideration. Should they be favorable, the mains being at a considerable height above the water-line, the runs short and the pipes not exposed, allow the maximum capacity as shown in table.

With unfavorable conditions, such as long and exposed mains, small boiler capacity, a great many branches with long horizontal runs, etc., use mains of large area.

Less than a 1$\frac{1}{2}$ inch pipe should not be used horizontally in a main, unless for a single radiator connection.

When mains are to be covered with some good non-conducting material, the surface in them need not be taken into account in proportioning their size, but when they are excessively long, or exposed to the cooling influence of the atmosphere, it should be considered.

When it becomes necessary to reduce a main in size, do not reduce at a point where any connection is taken off. It is better to reduce at a point ten or twelve feet beyond the connection.

All branch connections should be taken from the top of the main, using a tee on the main looking upwards, a nipple and elbow. This arrangement will permit of ample expansion and contraction.

Where return-pipes drop to enter the boiler, an automatic air-valve should be placed between elbow and water-line.

Globe valves should not be used upon low-pressure work. If their use cannot be avoided, place them in a vertical position, never in a horizontal position, as in this position they form a pocket for the lodgement of water.

The main, at point where connection to last radiator or riser is taken off, should be as high above the water-line as circumstances will permit. It is not good practice to place any connection less than two feet above water-line.

Special attention should be given to the expansion and contraction of pipes and allowance made for it. Pipes and branches must be unconfined, especially in the direction of their length. Expansion joints should not be used if expansion can be compensated for by the use of right-angle turns, etc. Risers should be supported near the middle of their height and left free to expand at the ends.

AMERICAN BOILER COMPANY,
NEW YORK, N. Y.

NOTES.

MESSRS. N. & G. TAYLOR CO., Philadelphia, Manufacturers of Tin-plates, report a large and steadily growing business in their roofing tin in rolls. These rolls are sheets of tin soldered together with the aid of rosin, no acid being used. They are then thoroughly painted on one side, and carefully put up in rolls ready for shipping.

These rolls are particularly adapted for quick contracts as the tin is all ready for instant use, and for laying on the roof. Messrs. N. & G. Taylor Co. originated the idea of continuous roofing tin some thirty (30) years ago, and do the largest business in this line of any house in the country. They make the tin in all grades from their celebrated Taylor "Old Style" brand, extra heavy coated, down to ordinary grades.

They are also agents for "The Pancoast Ventilator," which is recognized among the technical as being made under scientific principles, and to be a *ventilator that ventilates*. They invite correspondence.

THE illustration of the Rotunda of the University of Virginia, which will be found elsewhere in this issue, is of especial interest at this time, as it affords a reason for stating that the fatal accident that occurred last month in one of the University buildings was due to the collapse of a *concrete* ceiling, built after another method than the tile dome here shown and by contractors who had no slightest connection with Mr. Guastavino or his method of "cohesive" building.

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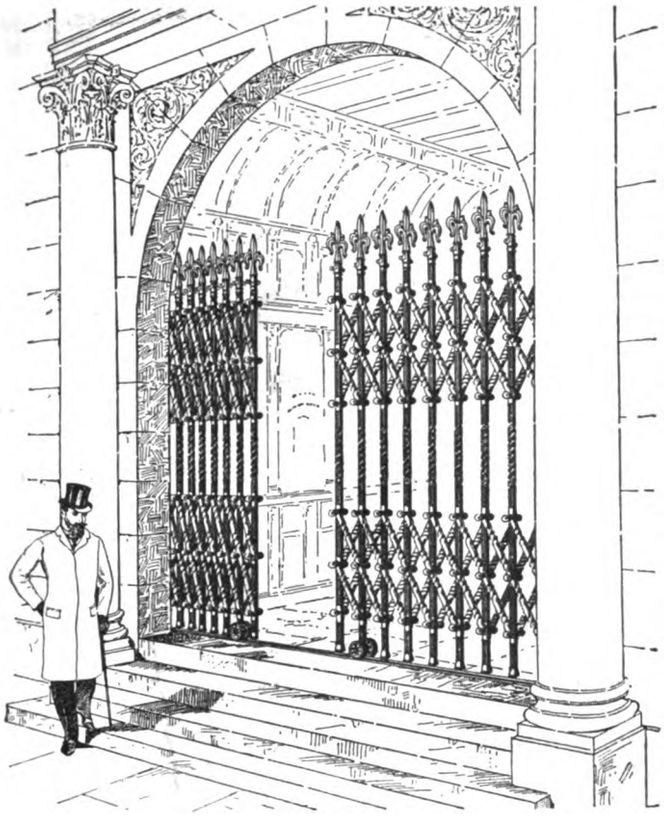
Price, 25 cents per copy.

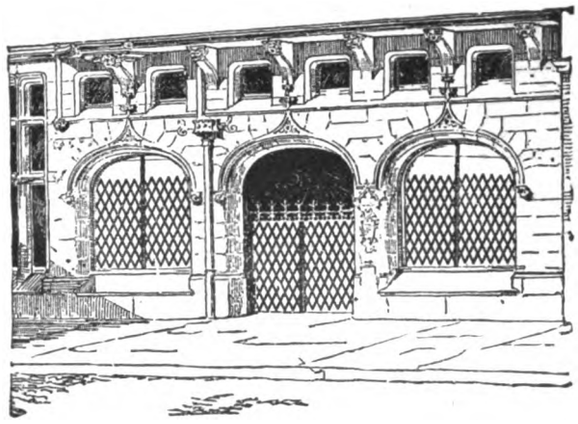
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NOTICE.

WE MANUFACTURE THE "PITT" PATENT AND THE "BOSTWICK" PATENT FOLDING GATES IN STEEL, BRASS AND BRONZE METAL, AND IN STEEL ELECTRO-PLATED.

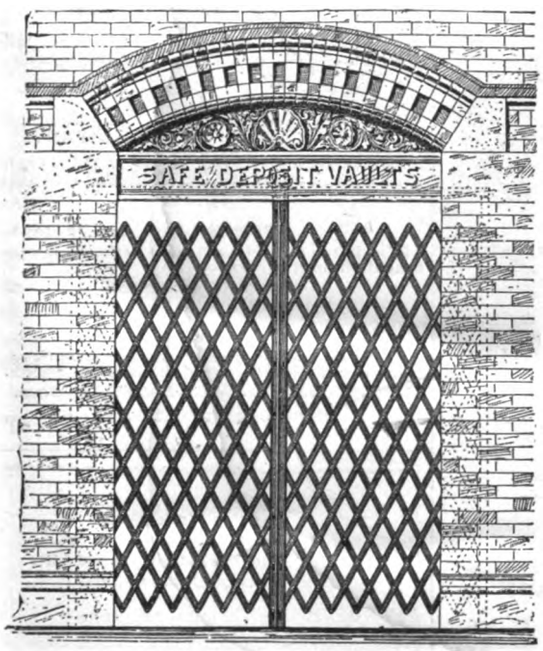
THESE GATES ARE EXTENSIVELY USED FOR THE PROTECTION OF STORES, OFFICE BUILDINGS AND PRIVATE RESIDENCES. MANY OF THE FINEST RESIDENCES IN NEW YORK AND OTHER PROMINENT CITIES OF THE UNION ARE PROTECTED WITH THESE GATES ON THE WINDOWS AND DOORWAYS THEY ARE BURGLAR-PROOF, AND IN THE SUMMER-TIME PERMIT OF PERFECT SAFETY AND VENTILATION.

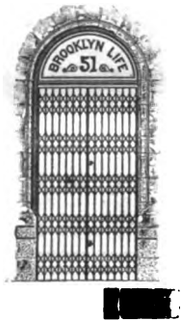
OUR GATES ARE USED FOR SAFETY IN ALL ELEVATOR OPENINGS AND ON ELEVATOR CARS. THEY ARE THE STRONGEST AND BEST, THEREFORE ARCHITECTS SHOULD SPECIFY THEM, AND THEN SEE THAT THE CONTRACTOR SUPPLY THEM AND NO OTHER.

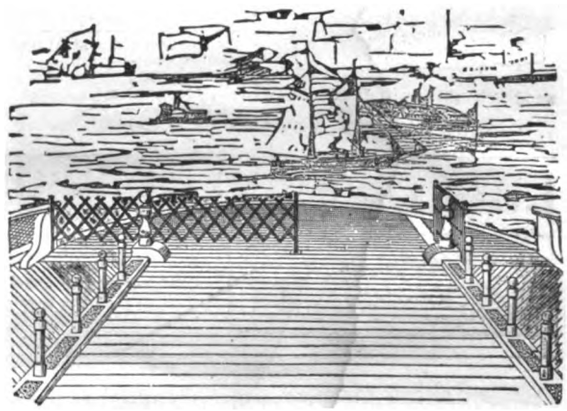
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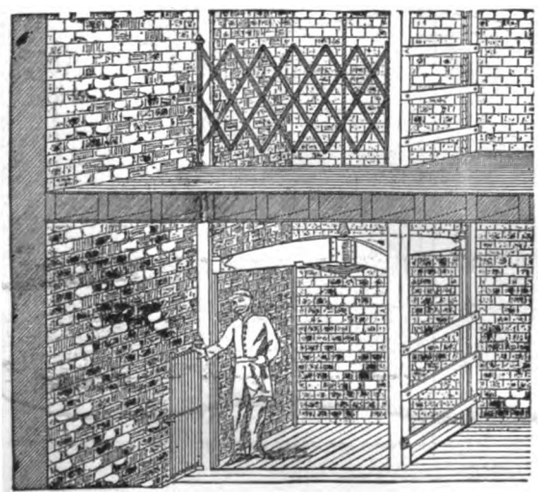
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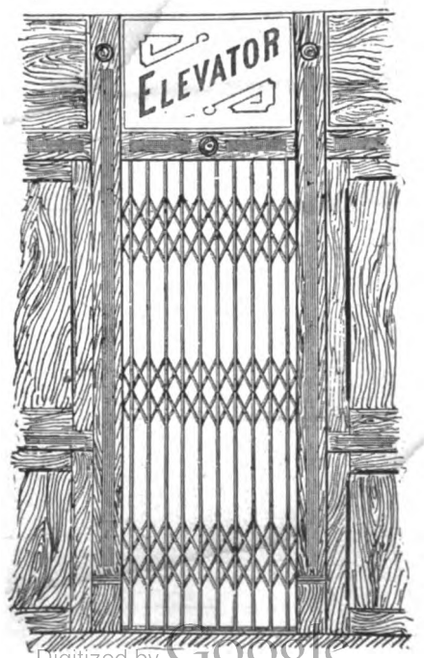












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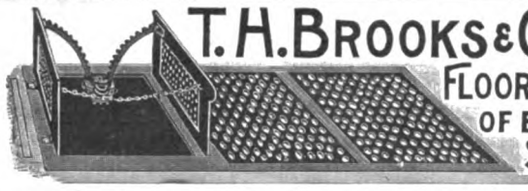
ALSEN'S PORTLAND CEMENT

is the strongest and most serviceable Cement made, and will permit the admixture of a larger amount of sand or gravel with less loss of strength than any other brand; it is therefore the most economical. It is the finest ground cement made, and has the largest bulk to the barrel.

The following test, made in actual work, by Col. D. C. HOUSTON, Corps of Engineers, U. S. A., at the sea wall around Governor's Island, New York Harbor, has never been equalled by any other cement. It is as follows: Tensile strength per square inch, one day, 384 pounds; seven days, 600 pounds; thirty days, 818 pounds.

For Sidewalks it gives the best color, and the most endurable wearing surface. Most of the prominent Railroad Bridges and the large Office Buildings of the country stand upon a foundation of concrete made of ALSEN'S CEMENT.

Alsen's Portland Cement Works, New York Office, 143 Liberty Street.



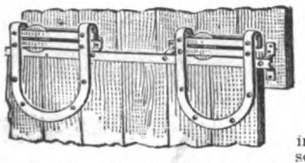
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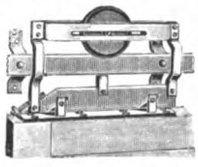
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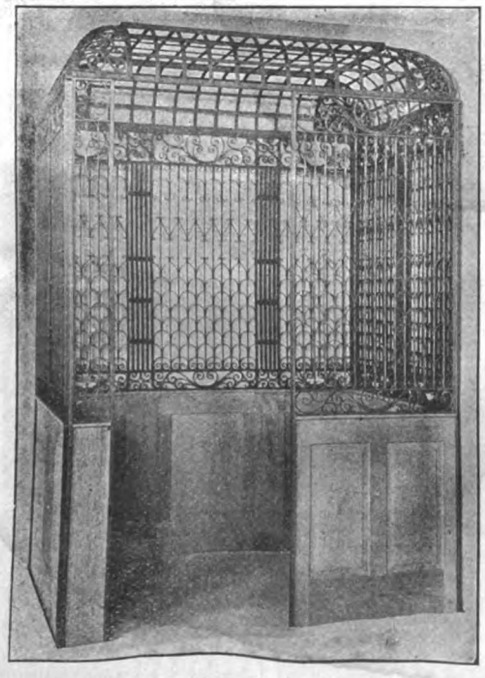
Hanger is made of steel throughout, including wheel, except the filling which deadens the sound. Single steel track instead of double wood rail. Ask your Hardware Dealer and send for Circular.

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Elevator Enclosures and Cabs,
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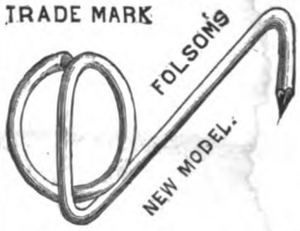
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I find it too valuable and have derived too many benefits from it to part company.
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MANY THOUSANDS OF OUR MACHINES IN USE ALL OVER THE WORLD

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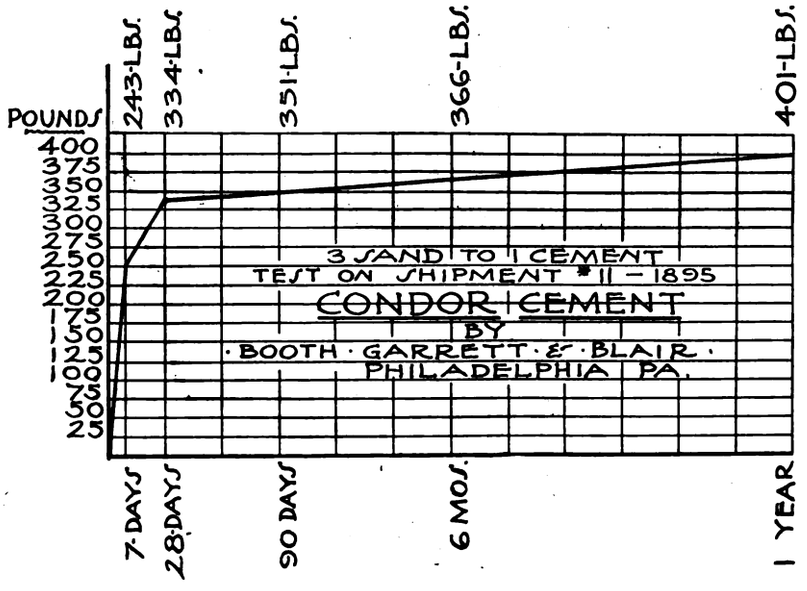
THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 174. SATURDAY, DECEMBER 5, 1896. VOLUME LIV. No. 1093.

CONDOR ARTIFICIAL PORTLAND CEMENT.

WHEN one makes a statement regarding an article he is endeavoring to place on the market, it is in justice to the purchaser, or consumer, that he stand willing to prove his claims by an impartial agent. This has always been our policy, and as a result we are to-day able to say that we have a ready market for our Condor Portland Cement, which no longer is unknown to the consumer of Portland Cements. On merits alone have we built up this reputation for a cement which has no superior. And to prove our claims, we have open for inspection the records of tests made of Condor Cement from the time we first started to import this brand.



With as few words as possible we wish to state the method we have adopted to protect both our patrons and ourselves. When a shipment is made to us from our principals, the North's Portland Cement Works, samples are taken by them and tests made. This record is forwarded to us with the invoice, and again, other samples are placed in a metallic box, sealed and numbered, and held as reference should a controversy arise. Immediately on the arrival of the cement we have the casks inspected by a recognized cement testing firm, samples taken, and experiments made to determine the tensile strength, setting time and fineness. At different periods we have further tests made, such as the specific-gravity test, and also the test by chemical analysis. We therefore hold for reference a double record of tests, namely, those of our works, as well as those made here, of all the Condor Cement which we import. Every barrel of the shipment is stencilled with the number of our invoice, and again, in charging and billing our customers, a record is made of the number of the shipment.

Believing it would be of interest, we give the Record Tests of Condor Cement imported from January 1895 to November of this year, and we think that those conversant with the subject will agree that our claim for furnishing a cement which has not a superior is fully substantiated.

The average tests for all shipments covering this period, varying in quantity from 500 to 3,000 barrels, were as follows:

FINENESS.

98.27 per cent passed the No. 50 sieve.
89.07 " " " " " 100 "

SETTING TIME.

Initial Set..... 1 hour, 30 minutes.
Final Set..... 3 " 45 "

AVERAGE TENSILE STRENGTH.

NEAT CEMENT.	3 SAND TO 1 CEMENT.
7 Days.. 639 pounds.	7 days.. 236 pounds.
28 " .. 729 "	28 " .. 307 "
Water... 22 per cent.	Water... 10 per cent.

Ten briquettes were made from each shipment, and the above averages are computed from these records.

In September, 1895, we selected at random shipment No. 11, on which we had the following tests made. These tests were the average in each case from five briquettes, and show a gradual increase in tensile strength over a period of one year.

FINENESS.

99.6 per cent passed the No. 50 sieve.
92.7 " " " " " 100 "
66.5 " " " " " 200 "

SETTING TIME.

Initial Set..... 1 hour, 20 minutes.
Final Set..... 3 " 25 "

TENSILE STRENGTH.

NEAT CEMENT.

1 Day..... 260 pounds.
7 " ..... 681 "
28 " ..... 765 "
Water..... 22 per cent.

ONE-YEAR TEST, IN AIR.

Briquette, No. 4,765..... 840 pounds.
" " 4,766..... 810 "
" " 4,767..... 870 "
" " 4,768..... 855 "
" " 4,769..... 790 "
Average.... 833 pounds.

ONE-YEAR TEST, IN WATER.

Briquette, No. 4,685..... 860 pounds.
" " 4,686..... 830 "
" " 4 687..... 822 "
" " 4,688..... 802 "
" " 4,689..... 852 "
Average.... 833 pounds.

SAND TEST.

1 Day,	1	Sand,	1	Cement..	202 pounds.
7 "	3	"	1	" ..	243 "
28 "	3	"	1	" ..	334 "
90 "	3	"	1	" ..	351 "
6 Months,	3	"	1	" ..	366 "
1 Year,	3	"	1	" ..	401 "

Water... 10 per cent.

Much could be said upon the excellent results, as shown above. With regard to the fineness, we wish to say that while Condor Cement is not the finest-ground cement on the market it is sufficiently fine to answer every practical purpose. There are some cements which leave no residue at all on the No. 50 sieve, and pass as much as seventy to eighty per cent through the No. 200 sieve. To obtain these results necessitates increased expense in manufacture, which is not commensurate with the results obtained. A cement which can show such a high and regularly increasing strength, as demonstrated by the sand tests, must be ground properly as well as of proper chemical composition. Antoine Gillis, director of the Syndicate of Artificial Portland Cement Manufacturers of Belgium, has stated that "Long experience has demonstrated that the finer ground cement did not give better results after two years." It is good, practical results at which we aim, and not so much that we may say that Condor is the finest ground cement on the market.

Setting Time.— Engineers and cement experts look often with suspicion on cements which have very excessive tensile strength in short-time tests. Such cements are generally chemically treated in order to show high tensile strength in the seven and

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twenty-eight-day tests, and are known to deteriorate in strength after a time, and often disintegrate.

In hydraulic work, where it is impossible to prevent the action of water from disturbing the concrete, quick-setting cements are almost indispensable. If, however, in putting down concrete for foundation work, it be possible even at an increased expense of mechanical contrivance that the concrete be kept intact from the action of currents of water until after the final set, the results obtained will be more satisfactory by using a medium or slow-setting cement.

Tensile Strength.— The sand tests, as shown above, speak for themselves. We wish especially to call your attention to the one-year tests, neat, in air and in water. Some cements are better adapted for work under water than others, but only a few are suitable for both purposes. It is remarkable that the five briquettes in air should average up exactly the same as those in water, and in this result we have a practical proof, aside from the chemical analysis, that we have produced so nearly the ideal cement.

Chemically analyzed, Condor cement shows as follows:

Silica	23.87	per cent.
Alumina	6.91	" "
Oxide of Iron	2.27	" "
Lime	64.49	" "
Magnesia	1.04	" "
Sulphuric Acid	0.88	" "
Specific Gravity	3.12	" "
Hydraulic Index	.47	" "

Few cements can show such a high percentage of lime as Condor, and at the same time such admirable proportion of lime to the silica and alumina. Were it not for this large percentage of these latter elements, it would be impossible to permit of what seems to be a "high limed" cement. It is agreed by cement authorities that it is a very desirable cement which can show these large percentages of the valuable constituents, and at the same time so little of the impurities, magnesia, sulphuric acid and iron. The permissible percentage of magnesia is a debatable question, yet this constituent is admitted to be one of the most treacherous impurities. The German Association of Cement Manufacturers started a few years ago to make a series of tests to determine the proper proportion of magnesia, which experiments have not yet been completed. It is generally admitted, however, that the limit of allowance should be between two per cent and three per cent. As Condor cement is already far below this limit we are little concerned as to the issue of this decision. In the case of the sulphuric acid, we are again below the danger point. Some cements require, it seems, the addition of sulphate of lime in order to retard the set; but from the nature of our raw material we are enabled to produce a cement which is exceedingly low in both magnesia and sulphuric acid. A prominent engineer was criticised lately for placing in his specifications for some very important work a limit of one per cent of sulphuric acid. It was claimed by the critics that sulphuric acid is necessary both to retard the set, which would naturally take place in fifteen minutes, and give a better tensile strength. From the above results we have demonstrated that a cement is manufactured which will qualify in every respect this engineer's requirements.

We have further information, which is at the disposal of any one feeling interested in the subject. Prices and information as to delivery will be gladly given.

EDWIN HALL & CO.,
305 Walnut Street, Philadelphia.

ASBESTOS NON-CONDUCTING COVERINGS.

Asbestos[1] non-conducting coverings are made from the well-known incombustible mineral, asbestos.

For purity of material, elasticity and adaptability of structure, combined with general completeness in design, looking to efficiency with durability, these coverings are easily superior to all others.

ASBESTOS FIRE-FELT COVERING.

Asbestos, in its fibrous or finely divided form, produces numerous air-cells, and is a non-conductor of heat of a high order.

Asbestos Fire-felt is a fabric of fibrous asbestos, and is made in rolls, sheets and pipe sections.

In Fire-felt we have the most successful application of the air-space principle yet devised, and in a material at once fireproof, elastic, pleasing in color, and susceptible of any desired mechanical arrangement.

Asbestos Fire-felt sections are of sizes to fit standard makes of wrought-iron pipes, and are carried in stock. For cast-iron pipes, we make them to order, but exact outside diameter of these pipes must be furnished.

Each section is 36″ in length. Quotations and correspondence invariably refer to the lineal foot. Orders are booked with this understanding, and all shipments are made in even 36″ lengths.

Fire-felt sections for steam-pipes approximate 1″ in thickness, increasing from the small sizes upward. They are covered with canvas, and bands for fastening are placed on each section.

ELBOWS, TEES, VALVES, ETC.

We carry in stock sectional coverings or fittings of Fire-felt for the elbows, tees and valves used in connection with standard wrought-iron pipes.

These asbestos fittings are canvased and banded, the same as the pipe-section.

Our largest stock size is for 12″ pipe.

Irregular elbows, tees and valves, if at all near the dimensions of regular sizes, are covered by cutting the regular asbestos coverings to fit, and using asbestos cement felting to make good the deficiencies.

On large surfaces we cut from a sheet of 1″ fire-felt sufficient to cover the iron, and wire same fast, finishing with asbestos cement in two coats. Sheet Fire-felt is furnished ½″, 1″, 1½″ and 2″ thick, in sheets 24″ x 36″. Use ordinary No. 19 annealed iron or copper wire; on large surfaces hexagonal wire cloth may be used. Long sweep elbows should be covered in this way. In ordering material for such fittings, give extreme lengths and circumferences.

LARGE PIPES, DOMES, BOILERS, ETC.

For large pipes, boilers and other large surfaces, Fire-felt is furnished in sheets.

Sheet Fire-felt is a firm even block of fibrous asbestos, surprisingly light in weight.

It is singularly adaptable to all situations of heat insulation, and will remain intact and effective where other materials crack and disintegrate.

It does not sag, settle or powder.

Sheet Fire-felt is replete with air-spaces, and is confessedly the best form of heat-insulator known.

It is also permanently durable.

A sheet of Asbestos Fire-felt measures 36″ long by 24″ wide. Regular thicknesses are ¼″, 1″, 1½″ and 2″. Sheets of special dimensions furnished to order. When desired, we make them to fit curves of any radius. Sheet Fire-felt is held fast to boilers and other large surfaces by wires. As a finish it is customary to use canvas or else Asbestos Cement Felting. We furnish these materials as extras.

FLUES, BREECHINGS, BULKHEADS, ETC.

These surfaces are successfully insulated with Asbestos Sheet Fire-felt. These sheets, 36″ x 24″, are easily applied, and owing to their extreme lightness in weight do not sag the iron, so remain permanently in place. Where thorough insulation is looked for, we use the 2″, or, at least, the 1½″ sheets, wired fast and given a finish of hot blast cement.

The expansion and contraction of large sheet-metal surfaces is often so great as to injure cement coverings. In placing sheet fire-felt next to the iron this difficulty is entirely overcome. Dry-houses, ceilings, etc., can be lined in this way.

BOILER TOPS, IRREGULAR SURFACES, ETC.

Asbesto-sponge Cement Felting, an improvement on the old style of cement felting, is an effective covering for boiler tops, domes and irregular surfaces.

It is furnished dry in bags; one bag contains sufficient material for covering 40 square feet flat surface 1″ thick. It should be mixed with water to the consistency of ordinary stiff mortar, and applied while the surface is hot, in three coats, to a thickness of at least 1½″.

We recommend Asbesto-sponge Cement Felting as a finish for roll and sheet fire-felt.

COLD WATER, AMMONIA AND BRINE PIPES.

So many difficulties attend the proper covering of cold pipes, and so much misinformation exists on this subject, that we prefer to correspond especially with those requiring such goods.

The thickness and arrangement of brine pipe-coverings depend upon the temperature of the brine, location of the pipes, etc. Prospective purchasers are asked for these particulars.

FURNACE PIPES, FURNACES, ETC.

For this work we manufacture our Fire-felt in rolls 36″ wide, $\frac{3}{32}$″, ⅛″ and ¼″ thick. The importance of covering hot-air pipes in cellars is not generally appreciated. Tons of coal are wasted yearly in each house containing a furnace, the hot air passing out to overheat the cellar, the rooms upstairs suffering in proportion. The lightest covering for a hot-air pipe should be $\frac{3}{32}$″ roll Fire-felt. This material is easily cut, passed over the pipe and wired in place. On furnaces use ¼″ roll Fire-felt, or, for the best possible protection, use 1″ sheet Fire-felt, and finish with cement felting. The practice of wrapping hot-air pipes with Asbestos Paper (*i. e.*, building felt) we cannot endorse. It does not sufficiently insulate the heat and cannot prove satisfactory.

H. W. JOHNS MFG. CO.,
87 Maiden Lane, New York.

[1] There are no approved forms of non-conducting coverings now in use which do not contain or depend upon asbestos.

N. & G. Taylor Company, Philadelphia, Pa., as manufacturers' agents for the Pancoast Ventilator, issue a striking circular showing a half-tone picture of a 66″ Pancoast Ventilator, 11 feet in diameter, which, with one of 84 inches, weighing over 1,000 pounds and nearly 14 feet in diameter, were lately sold to the Crittenden Manufacturing and Roofing Company of Minneapolis, Minn.

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SOME INTERESTING EXPERIMENTS.

AT the sixth annual or thirty-second meeting of the American Society of Mechanical Engineers, held at the rooms of the Society in New York City, in December, 1895, Mr. Albert Kingsbury, Durham, N. H., had a paper on "Experiments on the Friction of Screws." The tests were made by the aid of a specially designed machine built at the New Hampshire College shops. It now forms a part of the laboratory equipment of the college.

The author did not consider that the tests showed that any one of the metals developed less friction than any of the others, but the tests are specially interesting because of the great lessening of friction by means of graphite, as will be shown by the following :

Lubricator.	Minimum.	Maximum.	Mean.
Lard Oil.....	.09.....	.25.....	.11
(Heavy machinery), *Oil, Mineral*.....	.11.....	.19.....	.143
(Heavy machinery), *Oil and Graphite* (Equal volumes)....	.3.....	.15	.07

Mr. Kingsbury was complimented by Professor Thurston for the work he had accomplished. Personally, Professor Thurston had found that sperm oil was better than lard oil for reducing friction in such instances. He trusted that Mr. Kingsbury would continue his investigations.

Mr. Kingsbury felt gratified at the manner in which his paper had been discussed, and in a reply to a question that had been asked, he said that the graphite used was from the Joseph Dixon Crucible Company, Jersey City, N. J. He said he did not intend anything in the way of an advertisement. He also added that he had tried to purify the graphite, but there was no gain. In order to satisfactorily employ the graphite the fit must be loose.

Some years ago, when Professor Thurston was connected with Stevens Institute, he made a series of experiments to determine with scientific accuracy the value of graphite as a lubricant. He found that under the same number of pounds-pressure, and travelling at the same rate of speed, the bearings lubricated with Dixon's graphite, mixed with enough water to distribute it over the bearings, did nearly three times more work than the best quality of winter sperm oil. He also found that when 15 per cent, by weight, of graphite was added to the best quality of lubricating grease, he was able to run the bearings nearly six times longer, at the same high rate of speed, than when the bearings were lubricated with the same grease, without the addition of graphite. Furthermore, where the graphite was used there was no cutting and the bearings were in perfect condition.

Little, if any, of the commercial graphite in the market is fit for lubricating purposes, and bearings have been so frequently cut or ruined by its use, that there has been a very strong prejudice against its adoption by master-mechanics and superintendents having charge of expensive machinery. It is safe to say, however, that when graphite is properly prepared, it will not only reduce friction much better than any oil or grease alone, but, furthermore will perceptibly reduce the cost of lubrication.

JOSEPH DIXON CRUCIBLE COMPANY,
JERSEY CITY, N. J.

THE BEST BOILER.

AFTER deciding whether to use steam or hot water for warming a building, the next question is which is the best boiler to use. There are many styles of steam and hot-water boilers on the market, and as each manufacturer claims points of superiority over his competitors, it is very hard for a person not familiar with the construction of boilers to decide.

In order to obtain the most economical results from a boiler, the fire must be kept at a uniform depth over the grate by scattering a little coal over the fire at short intervals, the same as an engineer fires a power boiler, for if a boiler is not properly fired you will waste fuel and condemn it when the fault is entirely your own.

In heating a residence, convenience and comfort require a boiler that will run the longest possible time and require the least attention, for it is very inconvenient to care for a fire in a surface-burning boiler, which requires attention several times a day and has to be covered at night in order to keep it until morning, consequently very little or no heat can be had during the night. Therefore, for heating purposes, a boiler is required which is so constructed that it will be self-feeding and yet have a surface-burning fire.

The boiler which seems to fulfil these requirements is the Gorton Side-Feed Boiler, which has a reservoir for coal between the lower outer surface of the boiler and the upper part of the water-leg, and will hold enough coal to last from twelve to twenty-four hours. The coal in the reservoir feeds below the lower edge of the boiler shell, at an angle of 45 degrees, towards the centre, thus giving a surface-burning fire, with ample space between the top of the coal and the shell of the boiler for perfect combustion of the gases. These enter the tubes at the highest temperature, and, passing through, return down around the shell before going out through the smoke-pipe at the rear. The tubes are placed as thickly in the boiler as will admit of proper circulation, thus subdividing the water-spaces and enabling the heat to act most effectually, which makes the evaporative efficiency of this boiler fully equal to that of the return tubular power boiler.

It will therefore be seen from the above that the Gorton Side-Feed Boiler is built on the correct principle, to give the greatest economy in fuel with the least attention, and insures a warm building day and night.

GORTON & LIDGERWOOD MFG. CO.,
NEW YORK, N. Y.

Cathedral of St. John the Divine.
New York, N. Y.

WE offer the illustrations of the competitive designs for the great Protestant Episcopal Cathedral, now building on Bloomingdale Heights, New York, submitted by the following Architects:

CARRÈRE & HASTINGS	NEW YORK, N. Y.	CRAM & WENTWORTH	BOSTON, MASS.
EDWARD P. CASEY	" " "	JOHN LYMAN FAXON	" "
HENRY M. CONGDON	" " "	PEABODY & STEARNS	" "
ROBERT W. GIBSON	" " "	* * *	
R. G. GOODHUE	" " "	STEPHEN C. EARLE	WORCESTER, MASS.
HEINS & LAFARGE	" " "	* * *	
HUSS & BUCK	" " "	T. P. CHANDLER, JR.	PHILADELPHIA, PA.
W. A. POTTER & R. H. ROBERTSON	" " "	COPE & STEWARDSON	" "
RENWICK, ASPINWALL & RUSSELL	" " "	* * *	
FREDERICK C. WITHERS	" " "	W. S. FRAZER	PITTSBURGH, PA.
* * *		* * *	
PARFITT BROTHERS	BROOKLYN, N. Y.	L. S. BUFFINGTON	MINNEAPOLIS, MINN.
* * *		* * *	
W. HALSEY WOOD	NEWARK, N. J.	VAN BRUNT & HOWE	KANSAS CITY, MO.
* * *			

In all, fifty-seven plates [loose], 14 x 20 inches, printed on plate-paper.

PRICE, $2.50 PER SET.

AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, 211 TREMONT STREET, BOSTON, MASS., U.S.A.

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ALSEN'S PORTLAND CEMENT

is the strongest and most serviceable Cement made, and will permit the admixture of a larger amount of sand or gravel with less loss of strength than any other brand; it is therefore the most economical. It is the finest ground cement made, and has the largest bulk to the barrel.

The following test, made in actual work, by Col. D. C. Houston, Corps of Engineers, U. S. A., at the sea wall around Governor's Island, New York Harbor, has never been equalled by any other cement. It is as follows: Tensile strength per square inch, one day, 384 pounds; seven days, 600 pounds; thirty days, 818 pounds.

For Sidewalks it gives the best color, and the most endurable wearing surface. Most of the prominent Railroad Bridges and the large Office Buildings of the country stand upon a foundation of concrete made of ALSEN'S CEMENT.

Alsen's Portland Cement Works, New York Office, 143 Liberty Street.

NOTES.

The Henry R. Worthington Company, manufacturers of pumping machinery, has just received word through its London office that the exhibit of Worthington pumps at the Hungarian National Exhibition at Budapest has been awarded a Grand Millenium Medal. This medal is the only award made for pumping machinery at the Exhibition.

The change that has just taken place in the style and title of the Tiffany Pressed Brick Company, of Chicago, indicates with some significance the development of the use and manufacture in this country of enamelled brick. Hereafter this company is to be known as the Tiffany Enamelled Brick Co., which indicates that though the making of pressed brick is to be continued, the demand for enamelled brick has brought a greater development to that branch of their industry.

Mr. James S. Rankine, formerly President of the Pennsylvania Enamelled Brick Co., has become the Eastern Agent for the Chicago concern, with offices at 156 Broadway, New York.

Possibly no other among the many unique businesses conducted in the City of New York is better known or has a wider field of usefulness than the Manufacturers' Advertising Bureau.

This concern was established in 1879 by its present head and proprietor, Benj. R. Western, formerly publisher of the *Engineering and Mining Journal*, the *Manufacturer and Builder*, and *Coal and Iron Record*, all of New York.

Its purpose is the management of the newspaper work and advertising for manufacturers who desire this important branch of their business handled in a systematic and profitable way.

The Trade Journals are its field, and the Bureau is an acknowledged authority regarding mediums of this class.

Its long connection and intimate relations with the Trade press in all parts of the United States, and representing every industry, enable it to bring to its work an experience and knowledge that insures the best possible results.

The present location of the Manufacturers' Advertising Bureau, 126 Liberty Street, New York, is an admirable one and affords the best of facilities for transacting its large and growing business in a satisfactory and expeditious manner.

BUILDING INTELLIGENCE.

Reported for the American Architect & Building News

HOUSES.

New Rochelle, N. Y.—Two-st'y frame dwell.; $5,000; own., Walter Large; arch., R. Hanford Sturgis.

Brooklyn, N. Y.—*Richards St.*, n w cor. Fremont St., three-st'y and basement brick dwell., tin and slate roof; $16,000; own., William McGuire, on premises; arch., T. F. Houghton, 213 Montague St.

Fourth Ave., No. 102, three-st'y brick dwell., 20′ x 70′, tin roof; $5,500; own., Rose O'Brien, 37 St. Mark's Pl.; arch., W. J. Dithey, 1 Union Sq., New York City.

Fifty-eighth St., s s, 120′ w 5th Ave., 4 two-st'y and basement brick dwells., 20′ x 45′, tin roofs; $18,800; own. and arch., T. C. McKennee, 547A McDonough St.

Pacific St., n s, 183′ w 6th Ave., 7 three-st'y brick dwells., 20′ x 45′, tin roofs; $31,500; own., arch. and bld., C. P. S. Kelton, 296 Sixth Ave.

Prospect Pl., n s, 165′ 7″ w Bedford Ave., 8 two-st'y and basement brick dwells., 20′ x 45′, tin roofs; $28,000; own. and arch., J. F. Graham, 232 Sumner Ave.; bld., C. W. Dahl, 215 Chauncey St.

Church Ave., n e cor. East 21st St., two-st'y and attic frame dwell.; 36′ 8″ x 41′ 10″, shingle roof; $7,500; own., John L. Zabriskie, Flatbush and Church Aves.; arch., John J. Pettit, 186 Remsen St.; bld., J. C. Sawkins, 83 East Broadway.

Clinton Ave., s w cor. De Kalb Ave., four-st'y brick dwell., 24′ x 89′ 7″, tin roof; $28,000; own., James Burke, 191 Montague St.; arch., John L. Young, 1239 Bedford Ave.

Second St., n s, 225′ w 5th Ave., 4 four-st'y brick dwells., 26′ 10″ x 55′, tin roofs; $41,000; own., Murray Land and Improvement Co., 56 Myrtle Ave.; arch., L. Lauritzen, 24 East 23d St., New York.

Neptune Ave., s s, 25′ w Van Siden Pl., three-st'y frame dwell., 30′ x 55′, tin roof; $6,000; own., Mrs. Nellie Sypher, Stratton's Walk and the Bowery; arch. and bld., H. D. Whipple, West 8th St., nr. Surf Ave.

STORES.

Brooklyn, N. Y.—*Fifth Ave.*, e s, 22′ 6″ n 39th St., 3 five-st'y brick stores and dwells., 26′ x 60′, tin roofs; $32,500; own., M. F. Mills, 152 West 119th St., New York; arch., H. G. Siebel, 253 Broadway, New York.

Fifth Ave., n e cor. 39th St., five-st'y brick store and dwell., 22′ 6″ x 71′, tin roof; $12,500; own., M. F. Mills, 152 West 119th St., New York; arch., H. G. Siebel, 253 Broadway, New York.

Columbia St., No. 166, three-st'y brick store and dwell., 16′ x 75′ 6″, tin roof; $8,000; own., McInnerny Bros., on premises; arch., C. H. Gilvarry, 1 Broadway, New York; bld., C. F. Bond, 136 Liberty Ave.

Buffalo, N. Y.—*Washington St.*, n N. Y. C. and H. R. R. tracks, three-st'y brick store and flats, 23′ 9″ x 80′ 3″; $9,000; own., J. Schroeder; bld., Fred Luechman.

Main St., Nos. 554-562, seven-st'y fireproof store-building, 95′ x 116′; $120,000; own., C. W. Evans Estate; arch., E. A. Kent.

Main St., Nos. 468-470, five-st'y fireproof store-building, 30′ x 73′; $30,000; own., Philip Becker & Co.; bld., Henry Schaefers Sons; arch., R. A. Waite.

Pearl St., nr. Builder's Exchange, three-st'y brick store and office-building, 20′ x 40′ x 40′; $5,000; own., T. W. Miller; bld., Henry Rumrill, Jr. & Co.

Chicago, Ill.—Mrs. L. Hartman, three-st'y store and flats, 535 Forty-seventh St.; $13,500.

Ed. Bergh, three-st'y brick store and flats, 1299 Kimball Ave.; $8,000.

Orange, N. J.—Three-st'y brick store and factory; $10,000; own., Frank Jones; arch., F. R. Hasselman, Decker Building.

TENEMENT-HOUSES.

Buffalo, N. Y.—*Chenango St., Nos.* 94-96, three-st'y brick tenement, 46′ x 49′; $18,000; own., William D. Koelsch; bld., Michael Kempf.

WAREHOUSES.

Brooklyn, N. Y.—*Bryant St.*, on dock foot of, one and two-st'y brick store-house, 50′ x 100′, gravel roof; $5,000; own. and arch., Milliken Bros., 39 Cortlandt St., New York.

MISCELLANEOUS.

Buffalo, N. Y.—*William St.*, n s, e Jefferson St., five-st'y fireproof building for store and lodge purposes, 53′ x 105′; $55,000; own., East Side Odd Fellows Temple Association; arch., F. C. H. Mohr; bld., Wm. Schumacher.

(*Houses Continued.*)

New York, N. Y.—*Foster Ave. and Home St.*, 10 three-st'y frame dwells., 20′ x 60′, furnaces; $60,000; own., Charles Hohl, 1175 Foster Ave.; arch., Edw. Wenz, 1491 Third Ave.; not let.

One Hundred and Forty-first St., nr. Boulevard, 4 three-st'y brick dwells., each 18′ 9″ x 65′, furnaces; $50,000; own. and arch., John P. Leo, 2 East 125th St.

One Hundred and Eighteenth St., 6 three-st'y brick dwells.; $12,000 each; own. and bld., Francis Crawford; arch., Alfred H. Taylor.

West Seventy sixth St., No. 26, four-st'y dwell.; $40,000; own., Henry Goldman, 9 Pine St.; bld., J. Zimmerman, 1368 Broadway; arch., Schickel & Ditmar.

St. Louis, Mo.—Two-st'y dwell., s s Cleveland St., bet. Grand and Spring Sts.; $5,000; own., C. Pickel.

Two two-st'y dwells., s s Morgan St., bet. Sarah and Whittier Sts.; $9,000; own., F. Gear.

Two-and-one-half-st'y dwell., s s Raymond Pl., bet. Kingshighway and Academy St.; $5,000; own., I. J. Dunaway.

Two-and-one-half-st'y dwells., s s Raymond St., bet. Academy and Clarendon Sts.; $5,000; own., I. J. Dunaway.

Two two-and one-half-st'y dwells., s s Castlemann St., bet. Tower Grove and Klemm St.; $6,400; own., A. G. Aiple.

Two two-and-one-half-st'y dwells., s s McPherson St., bet., Lake and Union St.; $16,000; own., N. N. Culver.

Two-st'y dwell., s s Raymond Pl., bet. Clarendon and Academy Sts.; $5,300; own., Y. T. Marshall.

Three-st'y dwell., s s Washington Terrace, bet. Goodfellow and Union Sts.; $12,000; own., Snoquilmee R. E. Co.

Three-st'y dwell., n s Cabanne St., bet. Kingshighway and Academy St.; $5,000; own., B. Edmunds.

Two-and-one-half-st'y dwell., s s Cabanne Pl., bet. Clarendon and Academy; $4,500; own., S. S. Pomeroy.

OFFICE-BUILDINGS.

St. Louis, Mo.—Seventh and Pine Sts., twelve-st'y brick and stone office-building, 58′ x 185′; $350,000; own. Gen. Joseph Scott; arch., W. Albert Swasey; bld., George A. Fuller Construction Co., Chicago, Ill.

STABLES.

Boston, Mass.—*Wyoming St.*, nr. Warren St., one-st'y frame stable, 25′ x 35′, pitch roof, stoves; $1,500; own., Harriet B. Shaw, 3 Wyoming St.; not let.

Brookside Ave., No. 105, two-st'y frame stable, 24′ x 36′, flat roof, stoves; $1,200; own., arch. and bld., Joseph P. Shaw, 45 Eliot St., Jamaica Plain.

Spencer St., nr. Talbot Ave., one-st'y frame stable, 22′ x 25′, pitch roof; $800; own. and bld., Benj. J. Moxon, 47 Spencer St., Dorchester.

Chestnut Hill, Pa.—*Germantown Ave., No.* 7707, brick stable, 14′ x 14′; own., W. H. Foulk, Mermaid Ave.

Chicago, Ill.—Wm. R. Hennig, two-st'y brick barn, rear 4313 Grand Boulevard; $1,000.

H. F. Winkleman, two-st'y private stable, 741 North Kedzie Ave.; $1,000.

Cincinnati, O.—*McMillan St.*, two-st'y brick stable, 25′ x 25′; $800; own., Wm. Kalling; arch., Joseph Steinkamp.

Patterson St., frame shed, 2 frame stables, 30′ x 95′; $1,100; own., Cin. Street R. R. Co.; con., M. Marcus; arch., B. L. Baldwin.

Medford, Mass.—*Kenway St.*, one-and-one-half-st'y frame stable, 30′ x 30′, pitch roof; $750; own., W. B. Parker; bld., F. A. Harmon, on premises.

Newton, Mass.—*Winchester St.*, one-st'y frame stable, 30′ x 57′; $2,000; own., Rev. John F. Ford; Working Boys' Home.

Philadelphia, Pa.—*Reese St., No.* 3945, brick stable, 16′ x 32′; own., James Mallon, 3946 North 5th St.

STORES.

Boston, Mass.—*Dudley St., Guild Row and Roxbury St.*, Ward 19, 8 frame stores, two, 30′ x 50′, two-45′ x 50′, one, 40′ x 50′ x 58′, one, 24′ x 41′ x 50′, one, 20′ x 30′ x 50′, other, 24′ x 50′ x 58′, flat roofs, stoves; $15,000; own., H. E. & W. H. Weston, 125 St. Botolph St.; arch., Morrison & McEwen.

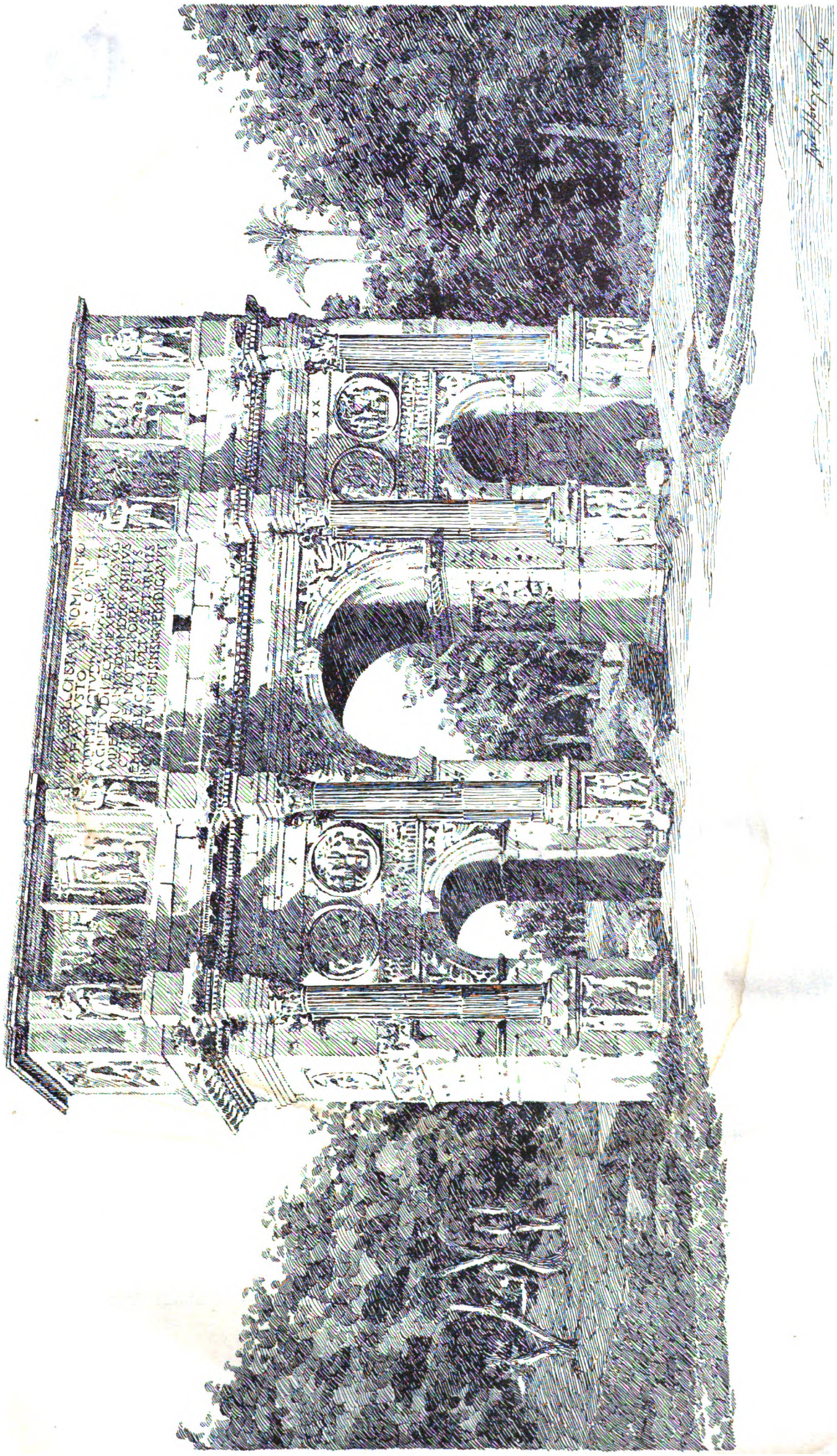
TENEMENT-HOUSES.

Lawrence, Mass.—*Broadway*, three-st'y brick building for 3 stores and 6 flats, 61′ x 76′, steam; $15,000; own. George H. Woodman, 82 East Haverhill St.; arch., George G. Adams; not let.

MISCELLANEOUS.

Boston, Mass.—*Neponset Ave.*, Ward 24, one-st'y frame car-house, 91′ x 540′, flat monitor roof, steam heat; $50,000; own., arch. and bld., West End St. Ry. Co., 81 Milk St.

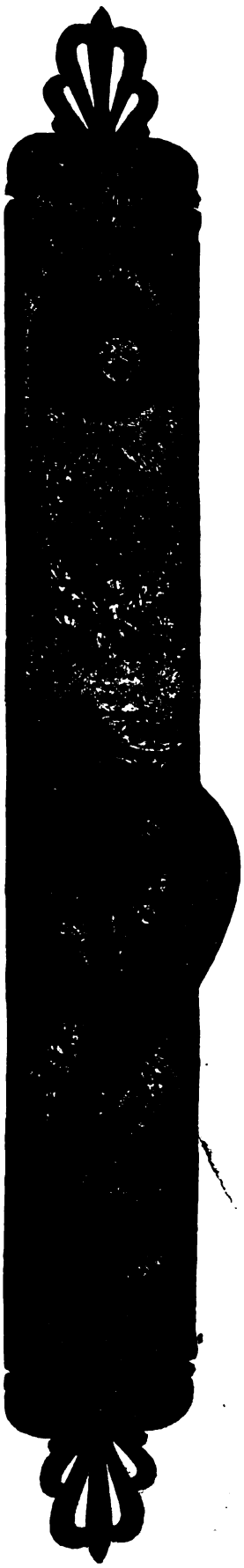
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Specimen of Pen-and-Ink Rendering, submitted for the Henry Perry Leland Prize, by Jane Hovey Allen, school of industrial art of the pennsylvania museum.

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The Yale & Towne Mfg. Co.



Ornamentation—Marengo.
School—Empire.
Size: 19 x 2½ inches.

The Yale Locks
Builders' Hardware
Art Metal Work

All Genuine Yale this Trefoil Y&T Hardware bears Trademark.

Hardware of Ornament in great variety and in all schools. Architects' Designs skillfully rendered.

GENERAL OFFICES:
84-86 Chambers St., New York.

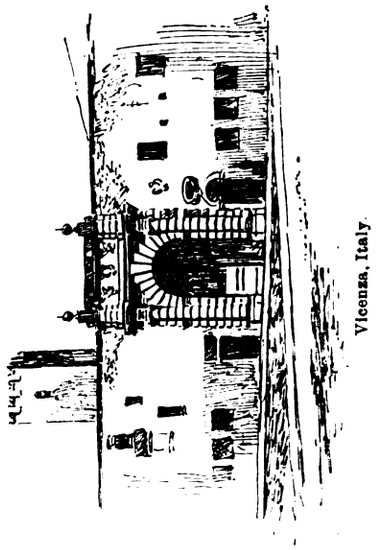
WESTERN OFFICE:
152-154 Wabash Ave., Chicago.

Local Offices:
Philadelphia, Boston, Buffalo and San Francisco.

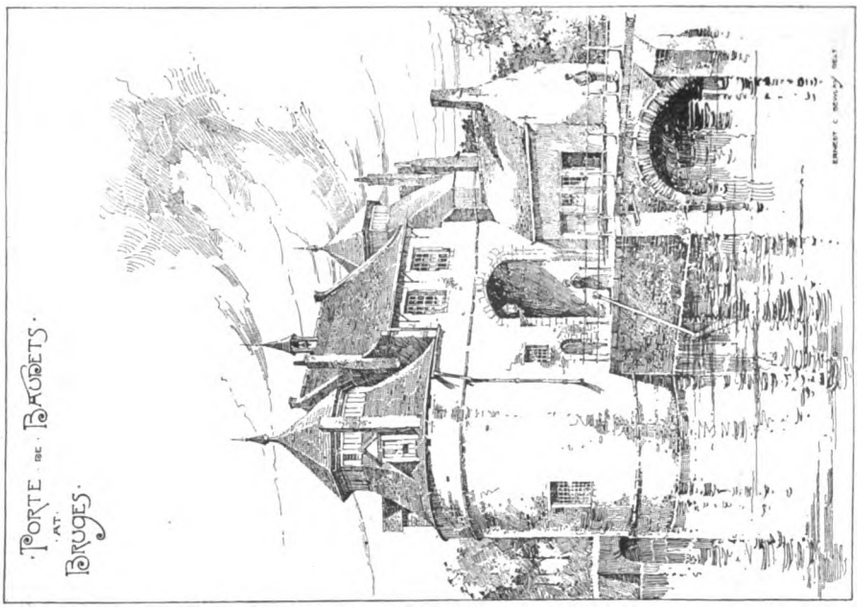
WORKS: Stamford, Conn., Branford, Conn.

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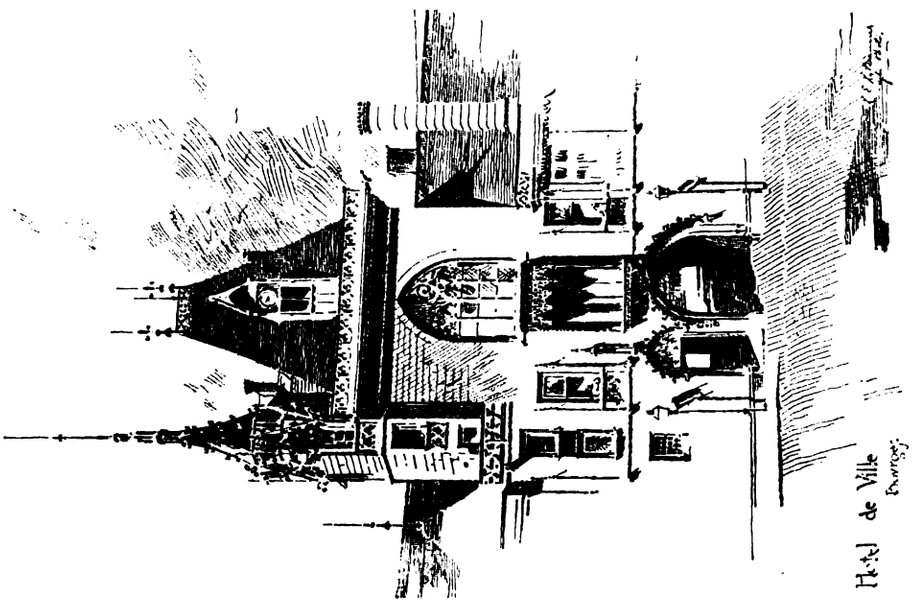
GATEWAYS.



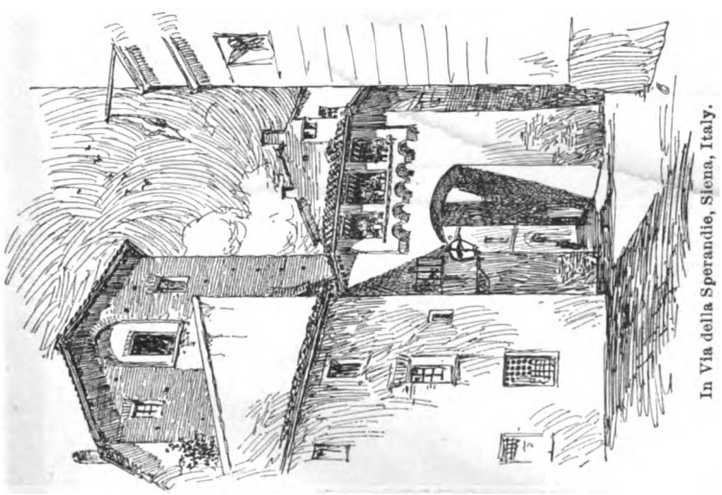
Vicenza, Italy.



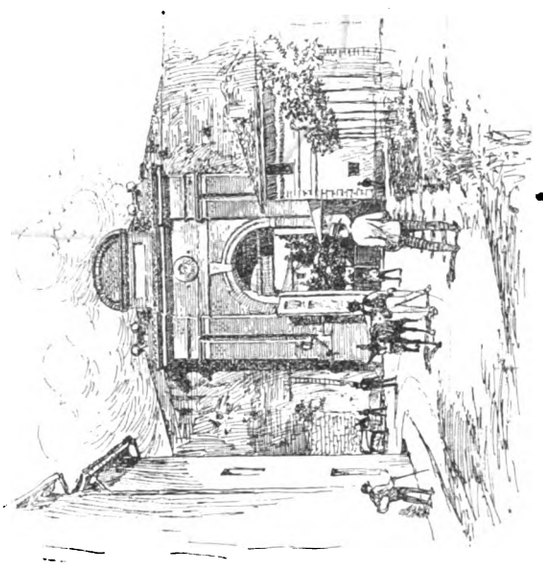
Porte de Baudets. at Bruges.



Hôtel de Ville Bourges.



In Via della Sperandie, Siena, Italy.



Porta Camollia, Siena, Italy.

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"LICHEN GRAY,"

A NEW SHADE IN

CABOT'S CREOSOTE SHINGLE STAIN.

A Soft, rock-gray with a delicate greenish cast which gives admirably the color effect of a lichen-grown bowlder.

A particularly appropriate and harmonious tone for country houses. It is known as

No. 1174 SPECIAL.

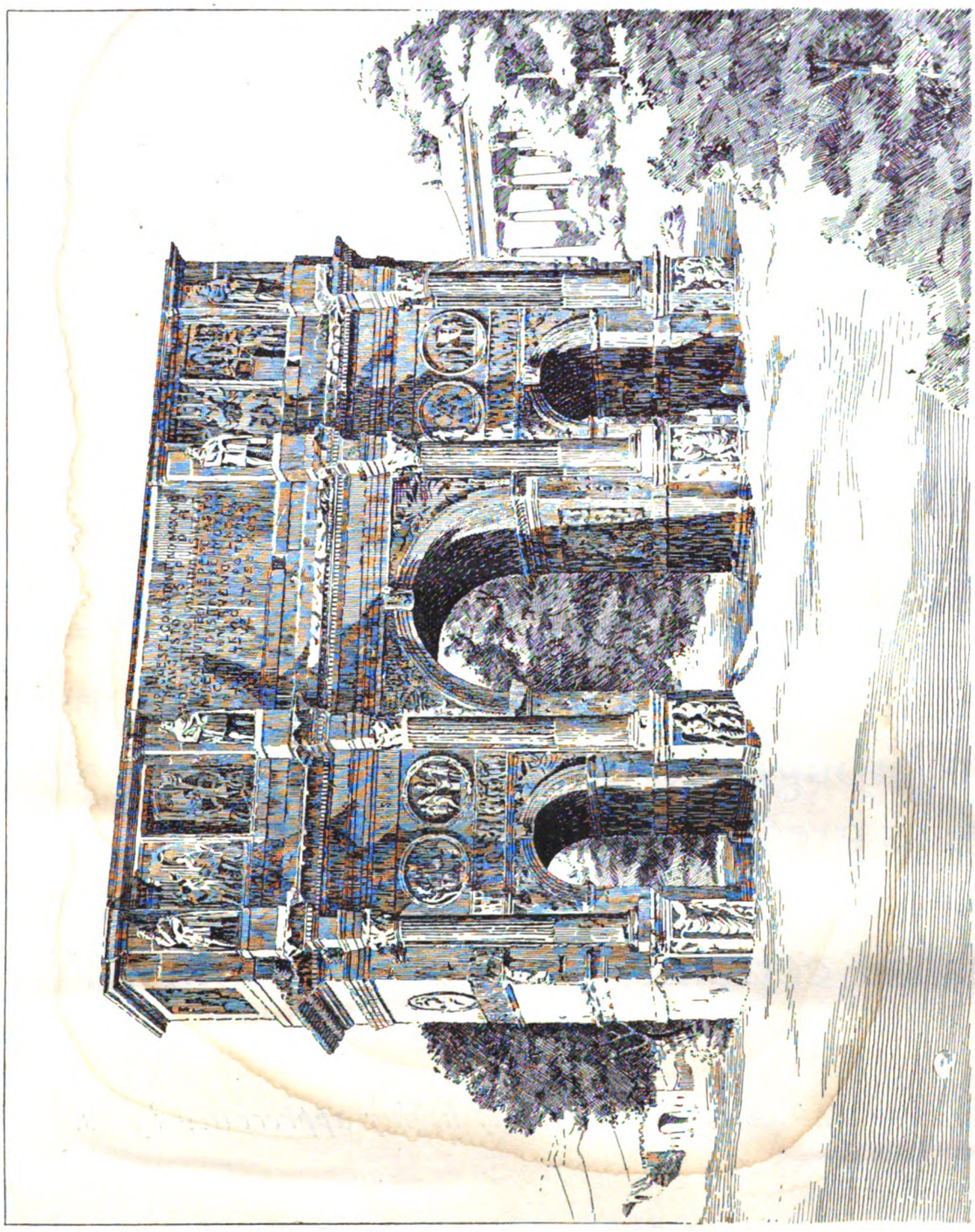
SAMPLES ON APPLICATION.

SAMUEL CABOT, Sole Manufacturer,

BOSTON, MASS.

Agents at all Central Points.

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Specimen of Pen-and-Ink Rendering, submitted for the Henry Perry Leland Prize, by Leon Demo, school of industrial art of the Pennsylvania Museum.

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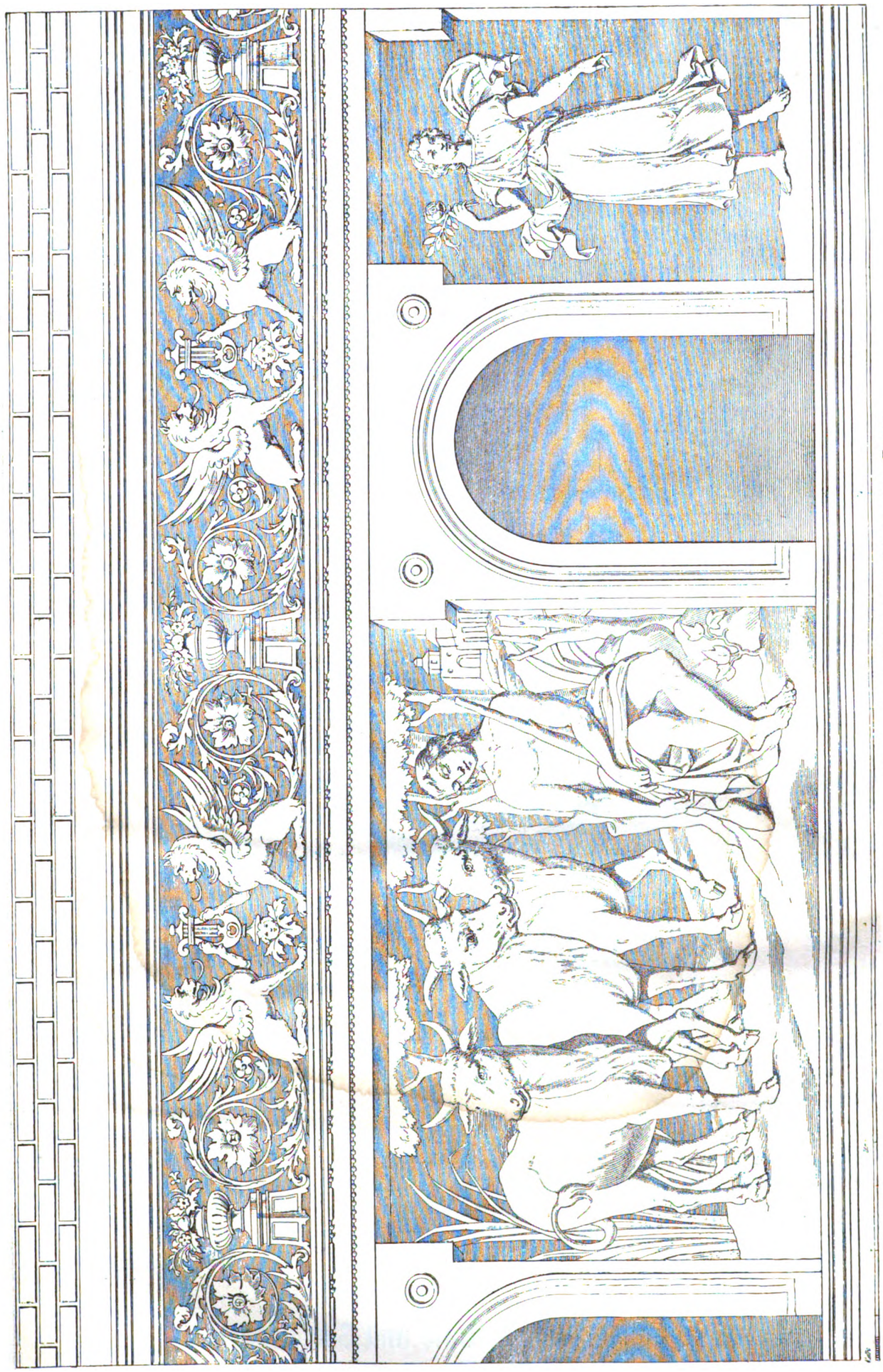
POTSDAM RED SANDSTONE * * *

Messrs. Yost & Packard, the eminent architects, of Columbus, Ohio, writing us under date of 9th inst. say: "Replying to yours of the 7th, would say, the building you refer to has so little stonework, and is of such cheap character that we could not use your material in it. We would say however, in this connection, that there is no material that has been brought to our notice for which we have as great respect as for your red sandstone, and as soon as opportunity offers we shall certainly avail ourselves of it."

Such unsolicited statements are naturally highly appreciated by us.

The Potsdam Red Sandstone Co.
POTSDAM, N. Y.

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Detail of Sgraffito Work, No. 4 Vicolo del Campanile, Rome.

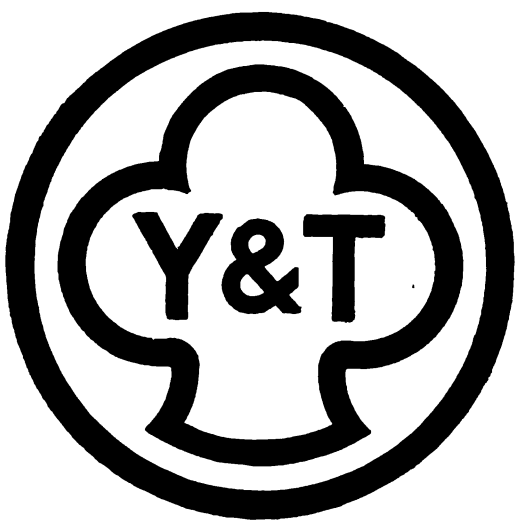
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The Yale Locks,

Builders' Hardware,

Art Metal Work.

All Genuine Yale Trefoil



Hardware bears this Trademark.

The Yale & Towne Manufacturing Co.

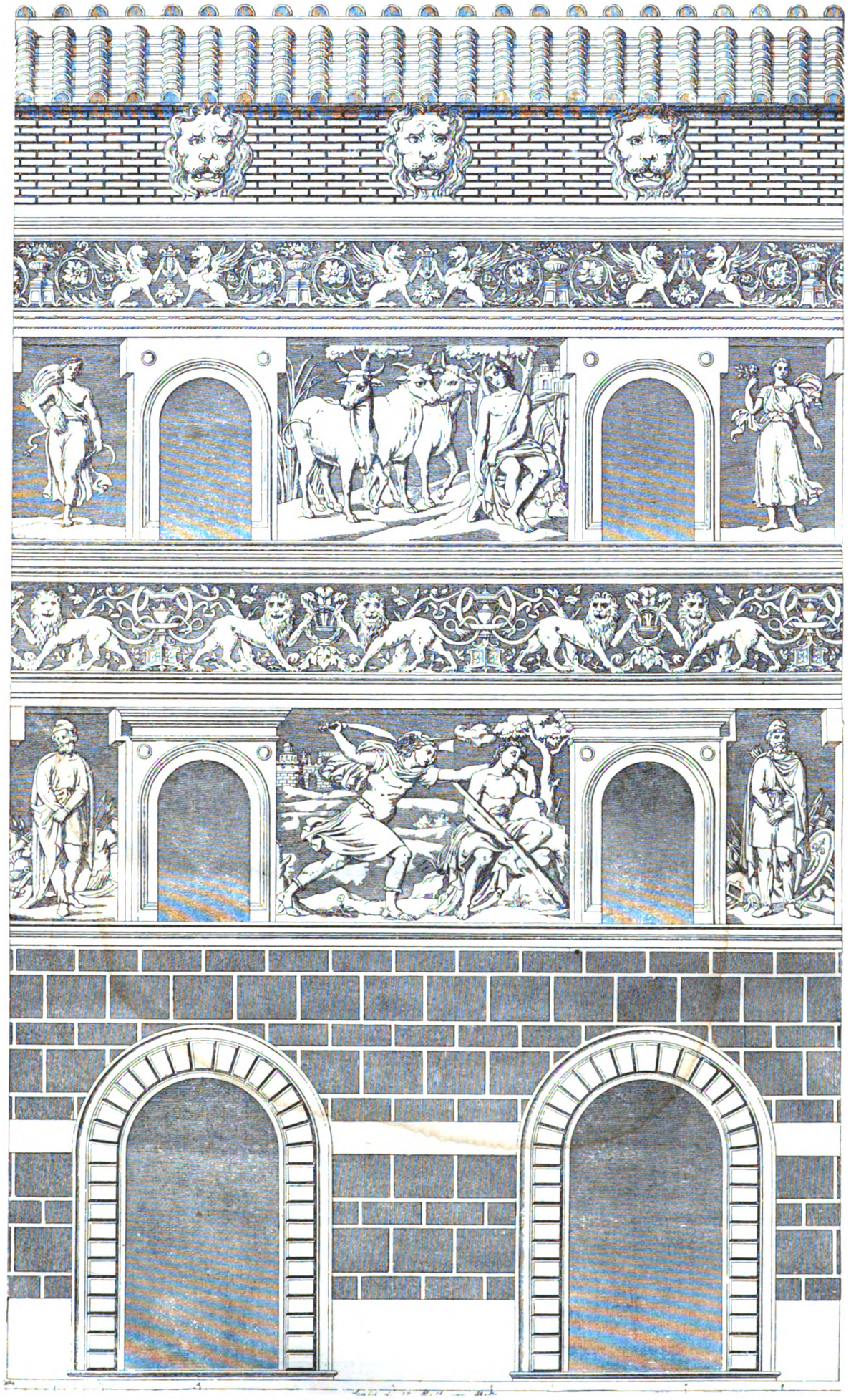
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Local Offices:
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Works: Stamford, Conn., Branford, Conn.

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House, No. 4 Vicolo del Campanile, Rome.

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VANDYKE BROWN, No. 1094,

A particularly rich and pleasing shade of Stain for shingled walls;

LIGHT SAGE GREEN, No. 96,

A soft and delicate gray-green shade, also for walls, and

POMPEIIAN RED, No. 1247,

for both roof and wall shingles, are some of the most popular. Special Shades in

CABOT'S CREOSOTE SHINGLE STAINS.

SAMPLES WILL BE SENT ON APPLICATION.

SAMUEL CABOT, Sole Manufacturer,

BOSTON, MASS.

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Detail of Sgraffito Work, No. 4 Vicolo del Campanile, Rome.

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POTSDAM RED SANDSTONE

* * *

Having lately installed a plant of tile-grinding machinery we are able to make prices for tiles ground to various sizes and forms, with perfect angles and surfaces. This material is considered by architects as superior to any other for tiling for public buildings. It never works loose from the cement holding it in place, will not wear slippery and its soft shades of red are particularly appropriate for large public lobbies and halls.

Several carloads of this tile will be used for the New York State Capitol at Albany.

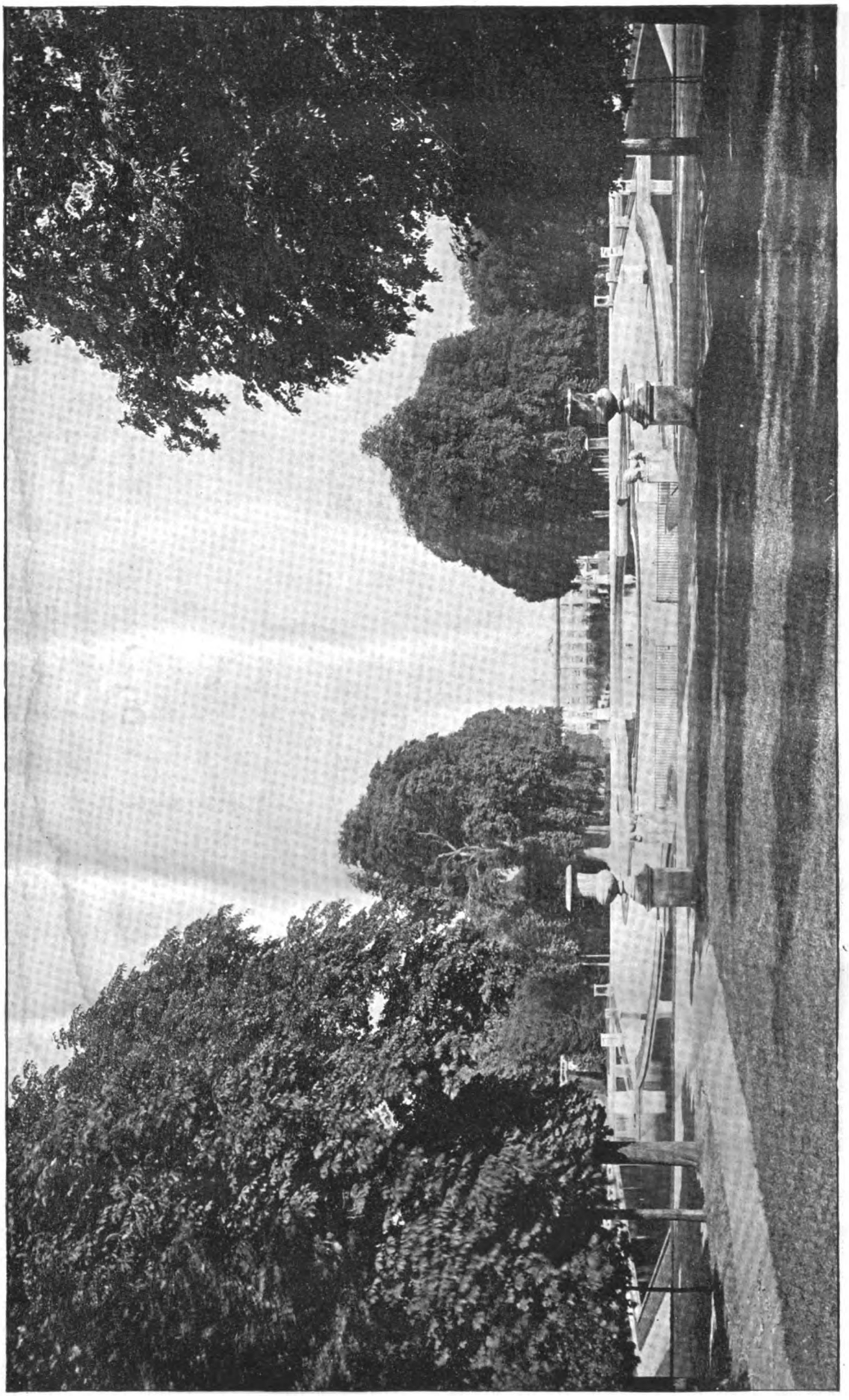
* * *

Address for samples, full particulars and prices,

The Potsdam Red Sandstone Co.
POTSDAM, N. Y.

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXXI.



THE PARK, ST. CLOUD, FRANCE.

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The Yale & Towne Mfg. Co.



Ornamentation—Marengo.
School—Empire.
Size: 19 x 2½ inches.

The Yale Locks
Builders' Hardware
Art Metal Work

All Genuine Yale this Trefoil Hardware bears Trademark.

Y&T

Hardware of Ornament in great variety and in all schools. Architects' Designs skillfully rendered.

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GILDED LEAD DECORATION ON THE QUEEN'S STAIRCASE,
PALACE OF VERSAILLES.

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SAMUEL CABOT, Sole Manufacturer,

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXXII.



LA GRANDE ALLÉE, GARDEN OF THE TUILERIES, PARIS, FRANCE.

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POTSDAM RED SANDSTONE

❋ ❋ ❋

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POTSDAM, N. Y.

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXXIV.



LE PRESBYTÈRE [MARIE ANTOINETTE'S COTTAGE], PETIT TRIANON, VERSAILLES, FRANCE.

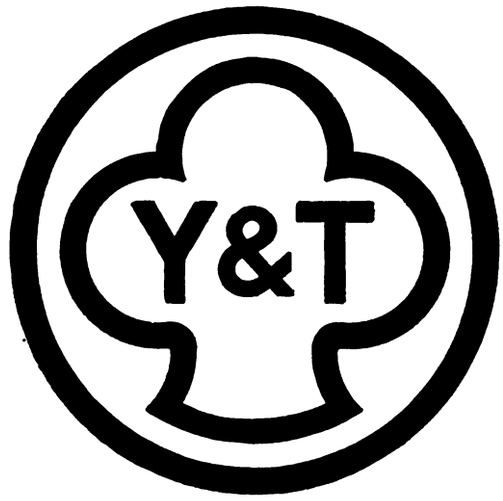
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The Yale Locks,

Builders' Hardware,

Art Metal Work.

All Genuine Yale Trefoil



Hardware bears this Trademark.

The Yale & Towne Manufacturing Co.

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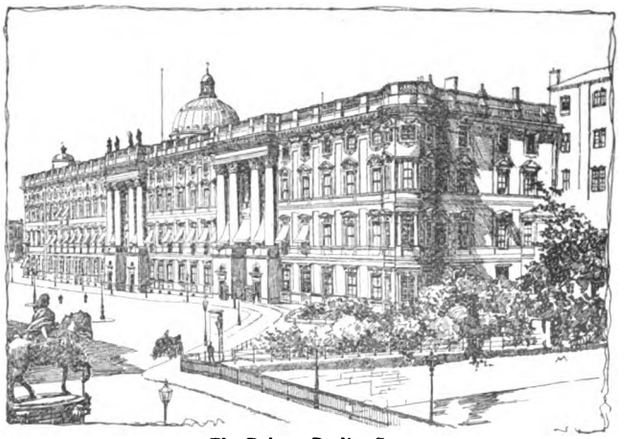
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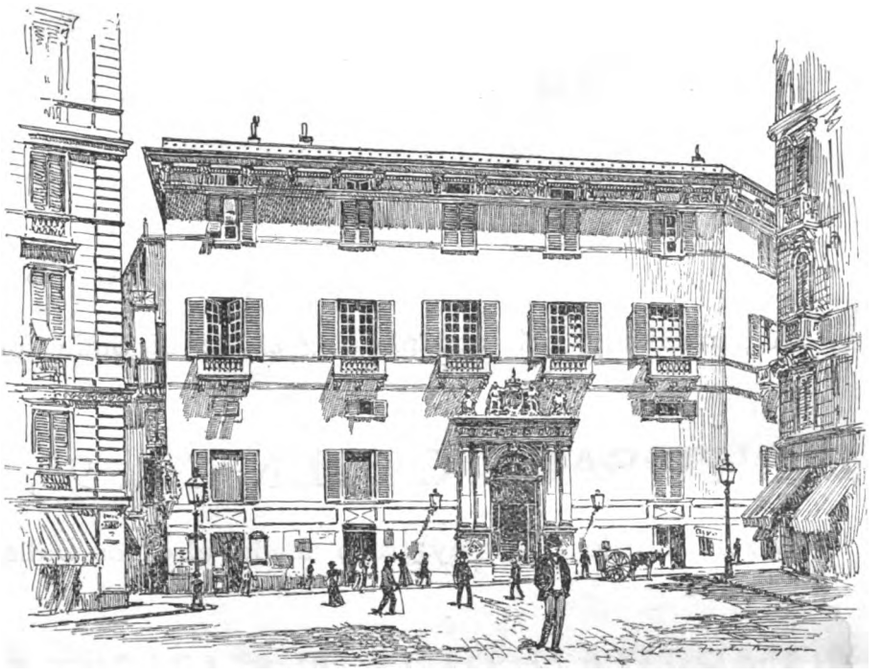
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The Hofburg, Vienna, Austria.



The Palace, Berlin, Germany.



Palazzo Spinola, Genoa, Italy.



The New Palace, Potsdam, Germany.

PALACES.

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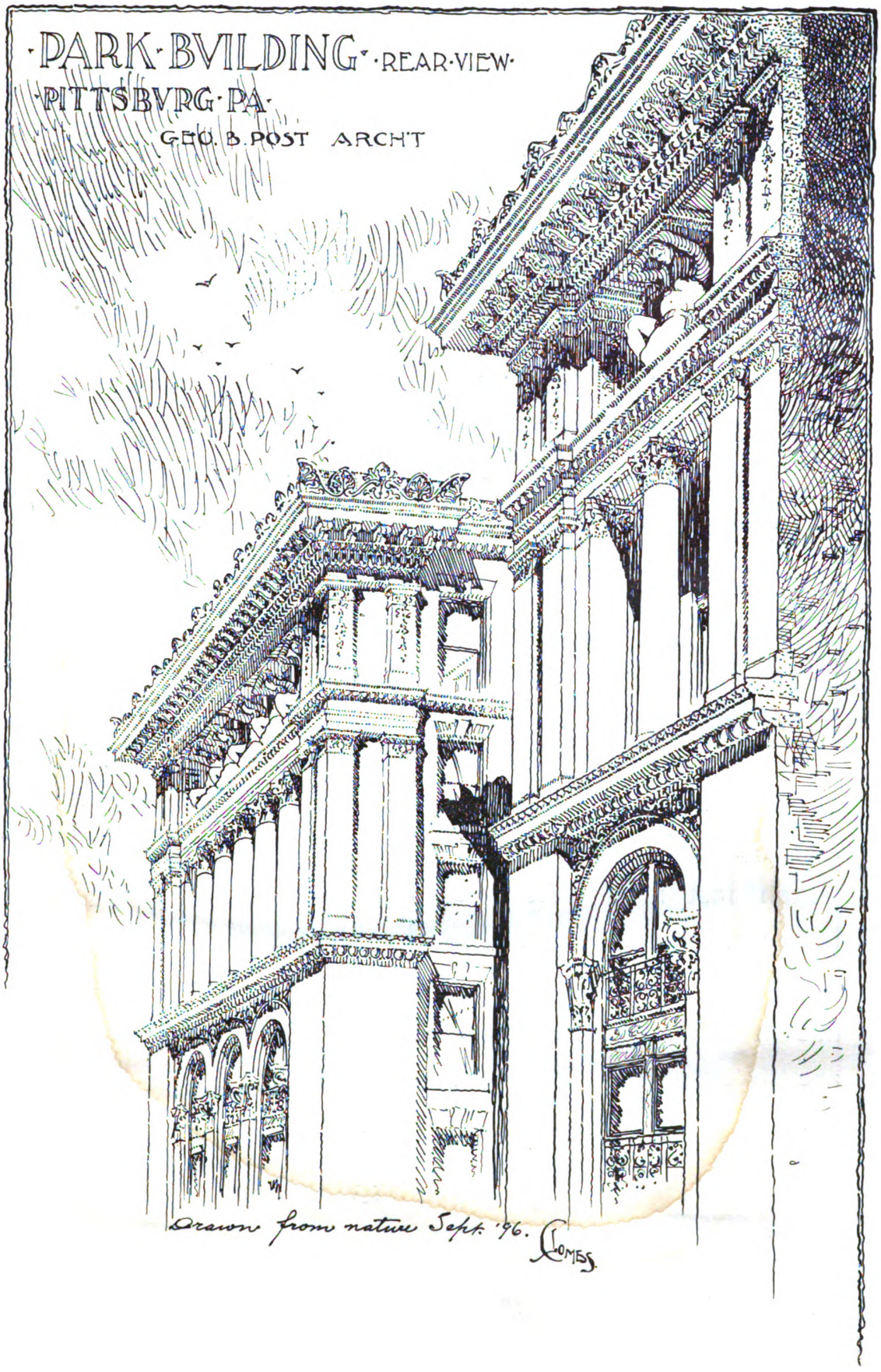
CABOT'S CREOSOTE SHINGLE STAINS.

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SAMUEL CABOT, Sole Manufacturer,

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POTSDAM RED SANDSTONE



The following extract in a late article by Dr. Wm. H. Wahl, A. M., PH. D., etc., Secretary of the Franklin Institute, is interesting as giving his opinion of this stone:—

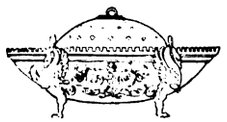
"The stone quarried at Potsdam is of the utmost strength and firmness of texture, being as strong and as capable of resisting crushing strains as any of the granites. In richness and brilliancy of color, it is unsurpassed. Its great density renders it almost absolutely weather-proof, and it is unfading in color, and absolutely unaffected by fire. From these comments it will appear that this remarkable-stone, because of its beauty and extraordinary durability—which last is unquestioned and demonstrated—approximates more closely to the ideal building stone than any other that has thus far been proposed for use in this country, where the conditions of service are so extreme."



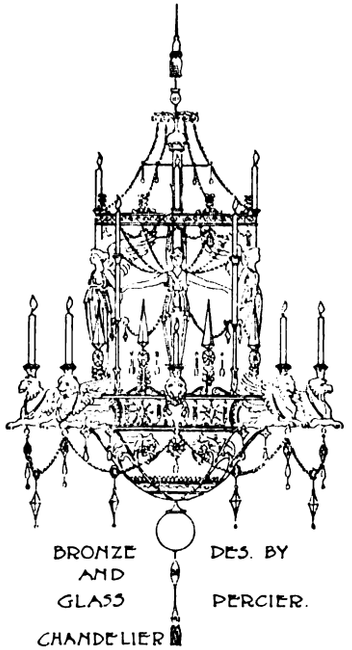
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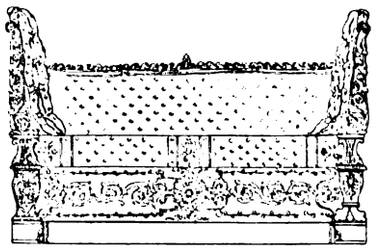


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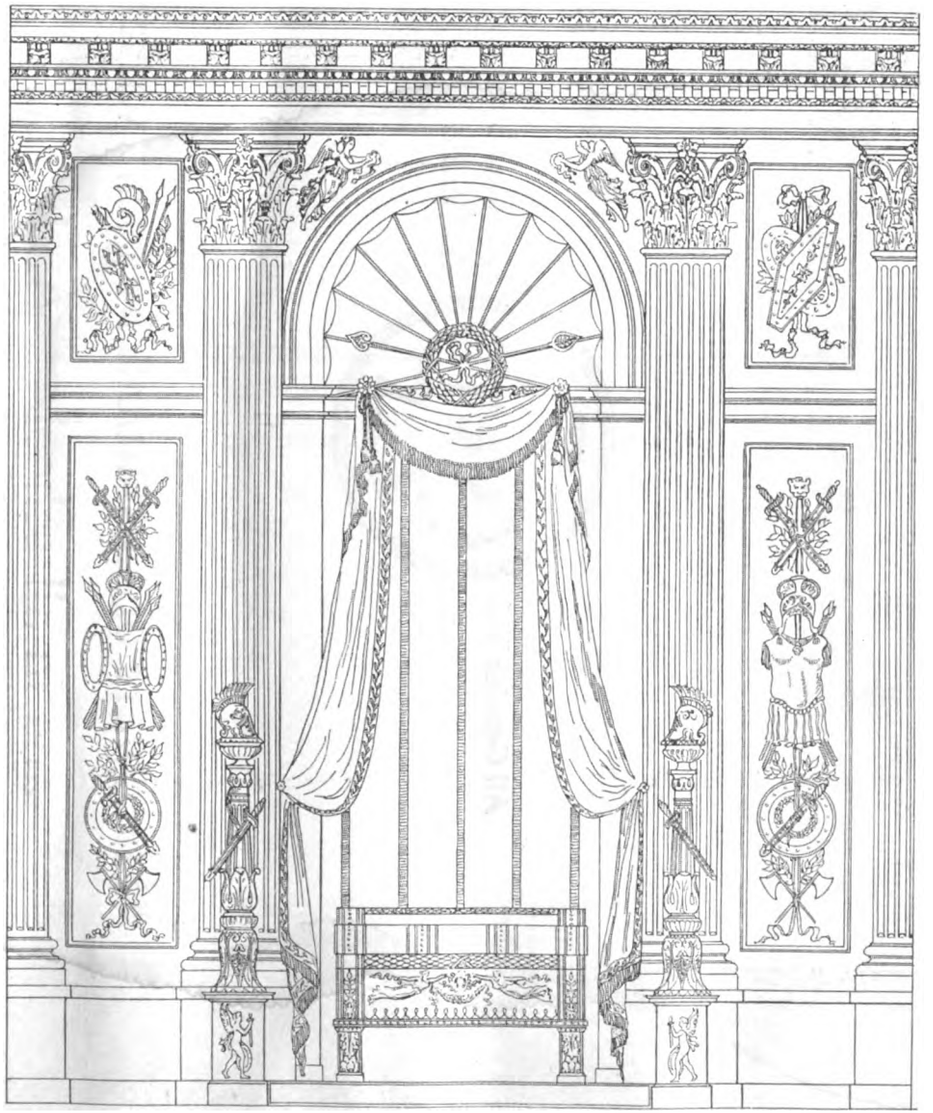


BRONZE AND GLASS CHANDELIER

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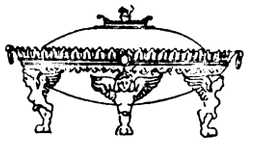
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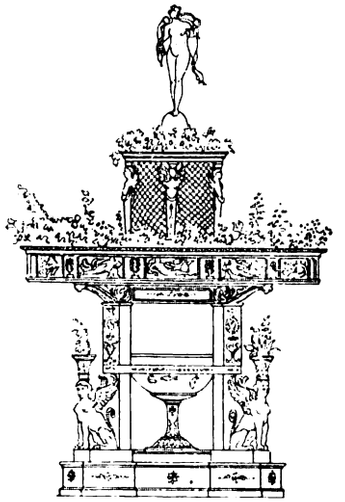
THE FIRST CONSUL'S BED - PALAIS ROYAL - PARIS....

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NO. 1.



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JARDINIÈRE. DES BY PERCIER



BOAT-SHAPED BEDSTEAD.
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The Yale & Towne Mfg. Co.



Ornamentation—Marengo.
School—Empire.
Size: 19 x 2½ inches.

The Yale Locks
Builders' Hardware
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All Genuine Yale Hardware bears this Trefoil Trademark.

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Hardware of Ornament in great variety and in all schools. Architects' Designs skillfully rendered.

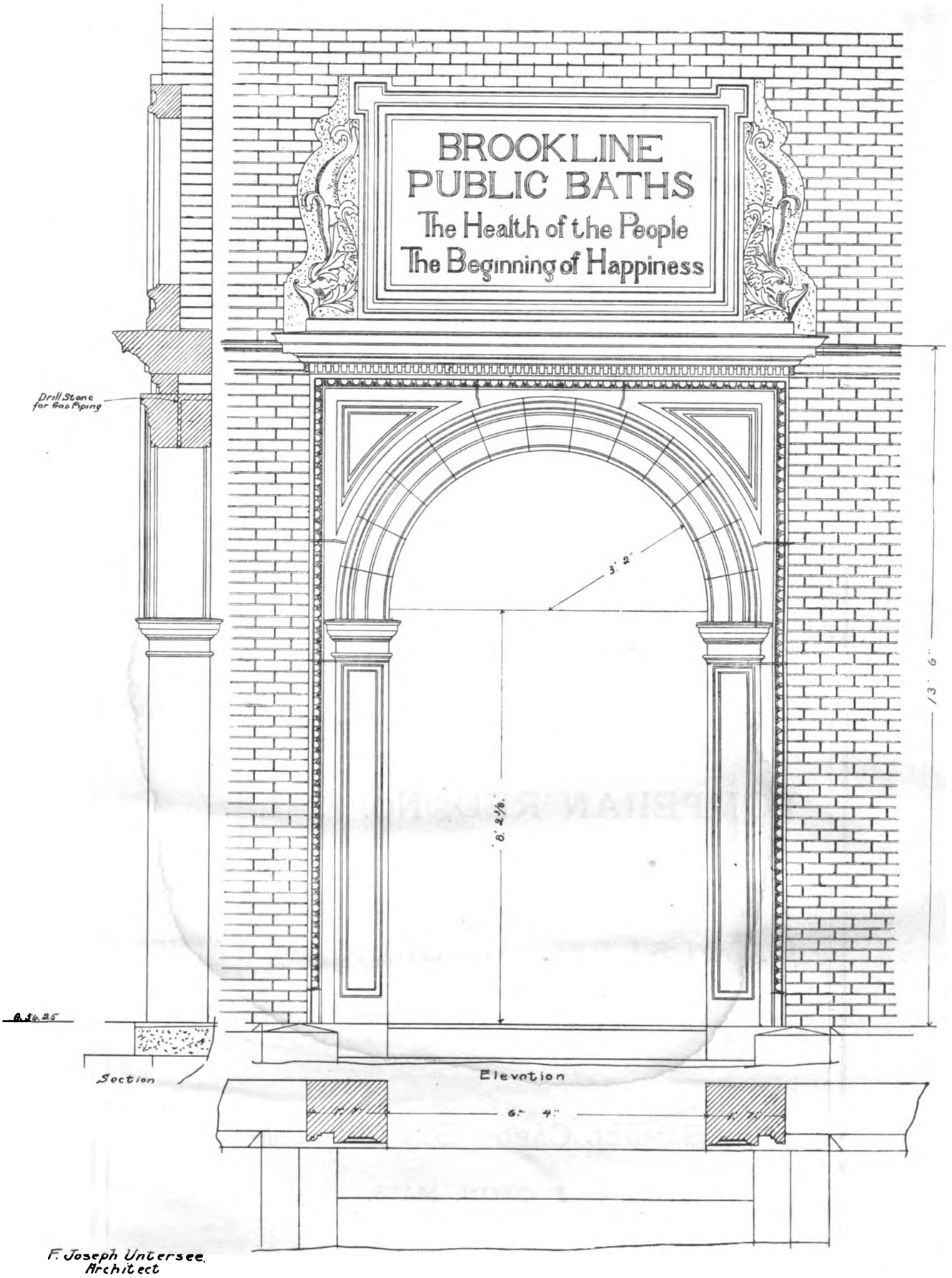
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Architect
608 Hancock Bldg. Boston.

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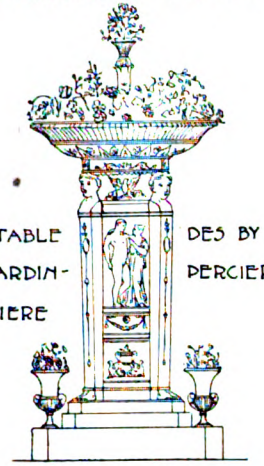
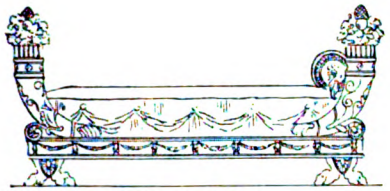
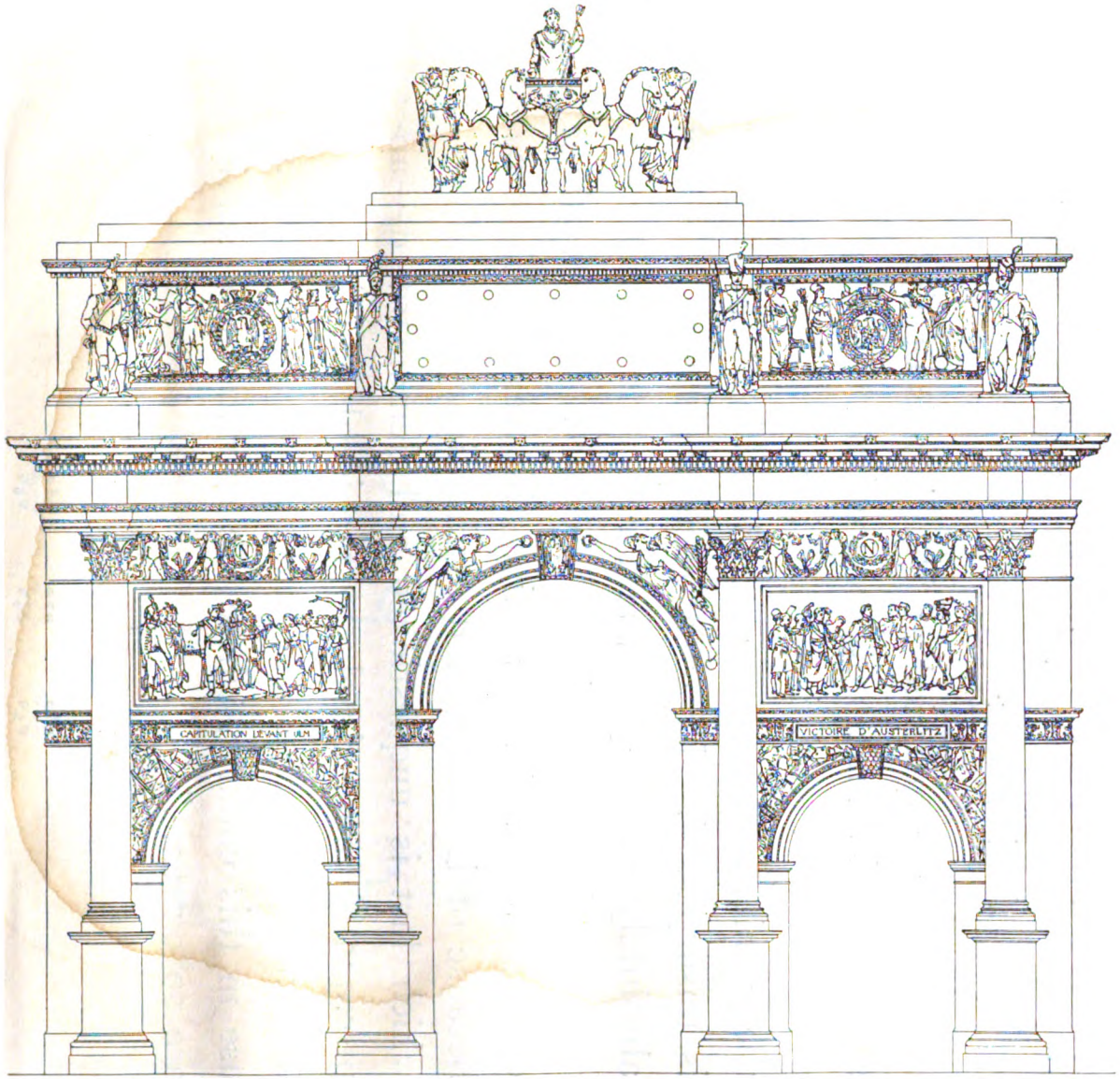


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BED USED BY NAPOLEON I
NOW IN THE GARDE-MEUBLE



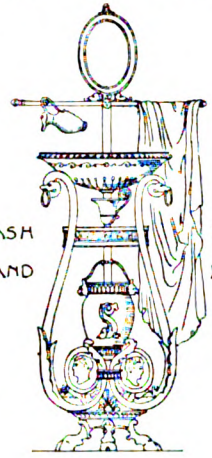
ARC DE TRIOMPHE DU CARROUSEL · PARIS · DES BY PERCIER.

EMPIRE STYLE

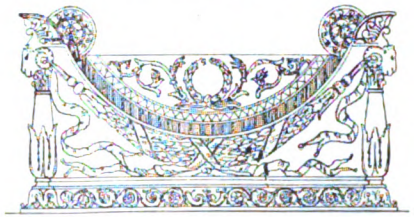
NO 2



ANTIQUE LAMP — BY PERCIER



WASH STAND — DES. BY PERCIER



DOUBLE-BOLSTERED BED · · ·
DATING FROM THE FIRST EMPIRE

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POTSDAM RED SANDSTONE



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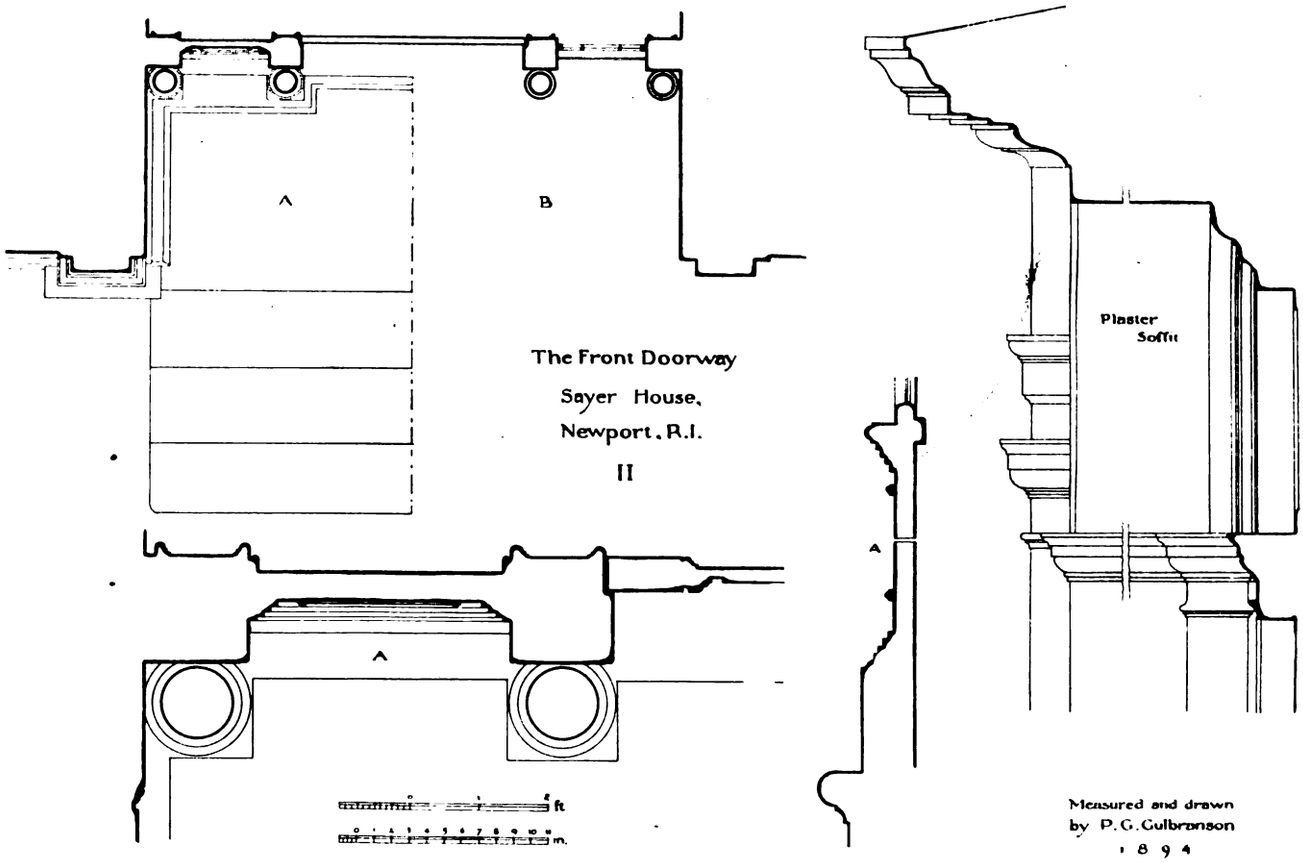


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The Potsdam Red Sandstone Co.
POTSDAM, N. Y.

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The Front Doorway
Sayer House,
Newport, R.I.
II

Measured and drawn
by P.G. Gulbranson
1894

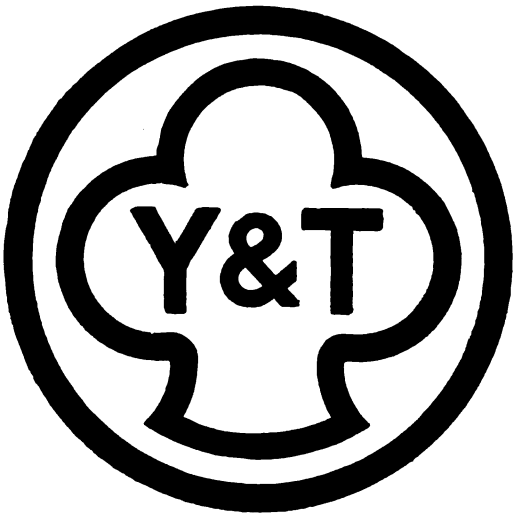
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The Yale Locks,

Builders' Hardware,

Art Metal Work.

All Genuine Yale Trefoil



Hardware bears this Trademark.

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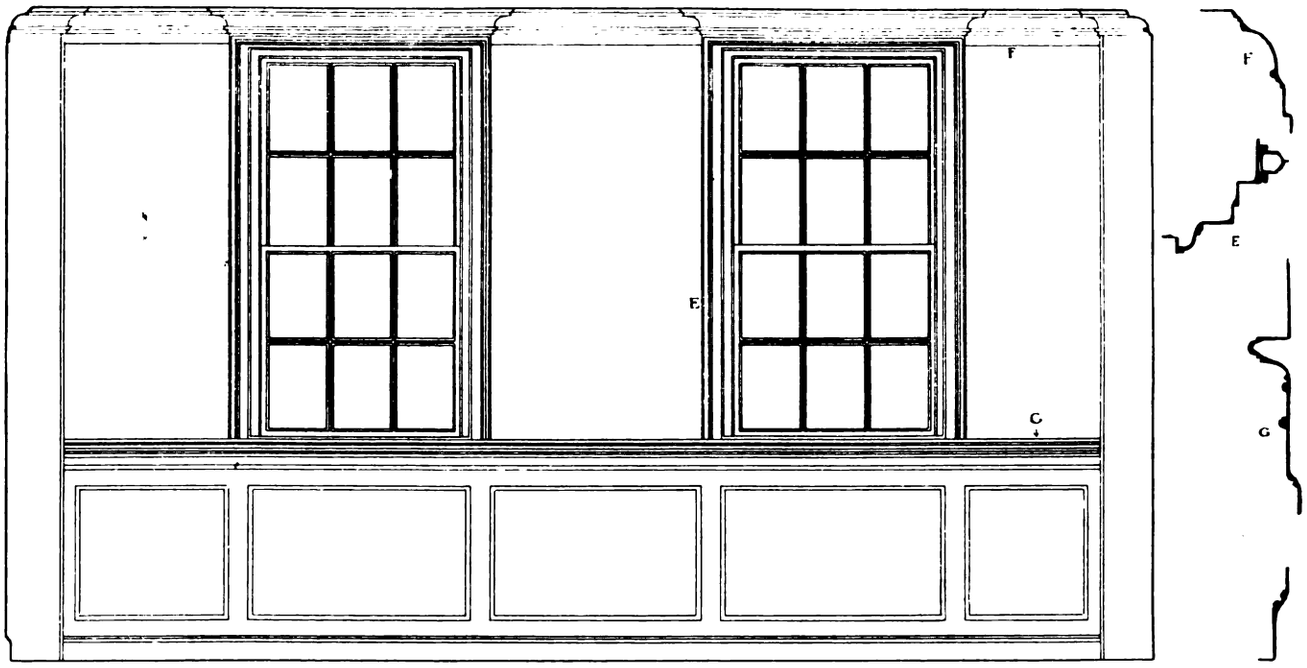
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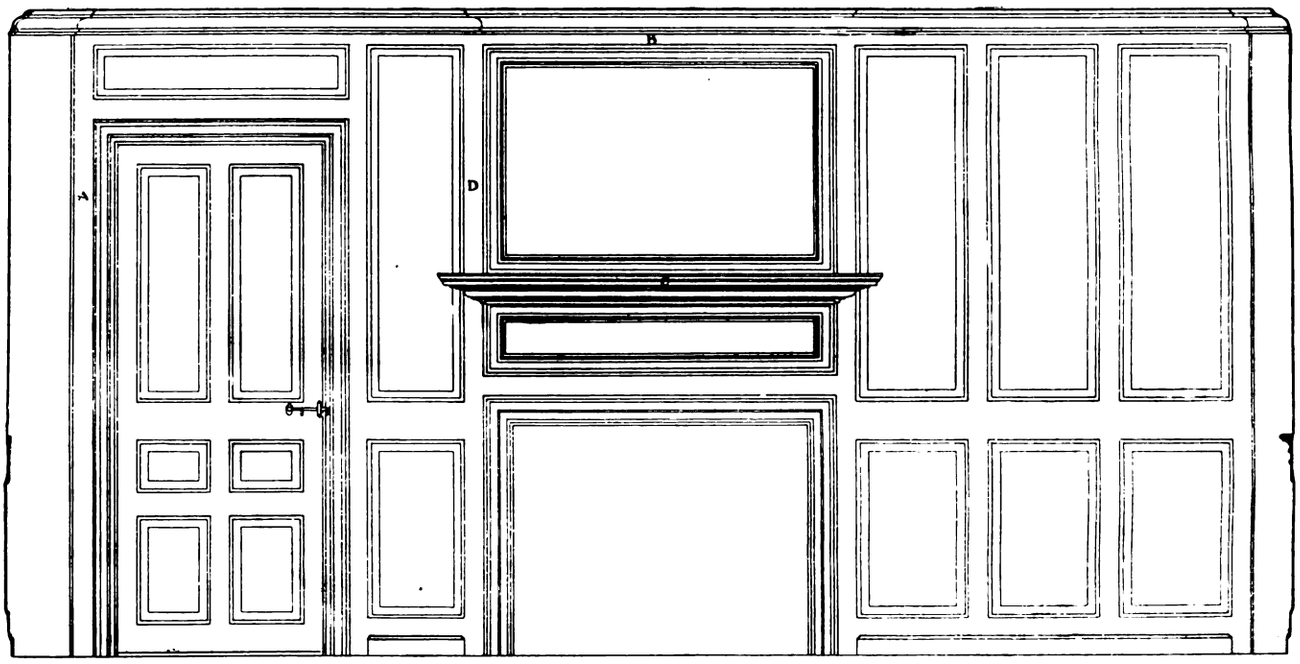
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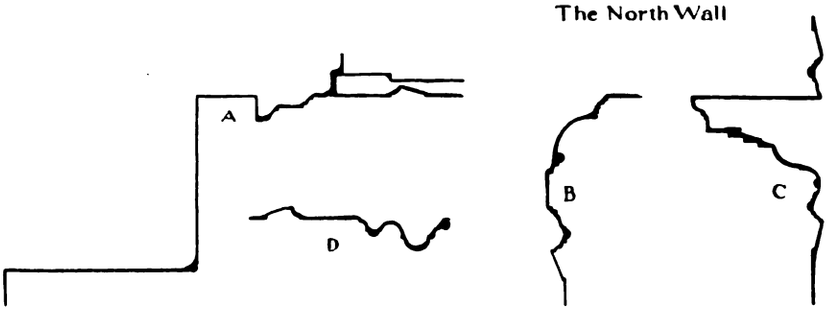
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The West Wall



The North Wall



The Sitting Room

Sayer House,
Newport, R.I.
III

Measured and drawn
by P. G. Gulbranson
1894

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The Disintegration of Brick Walls and Chimneys

caused by the absorption of moisture and the alternate freezing and thawing thereof in winter, can be prevented by the use of

Cabot's Brick Preservative

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A TRIAL IS SOLICITED.

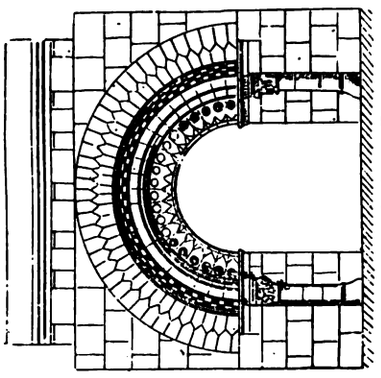
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BOSTON, MASS.

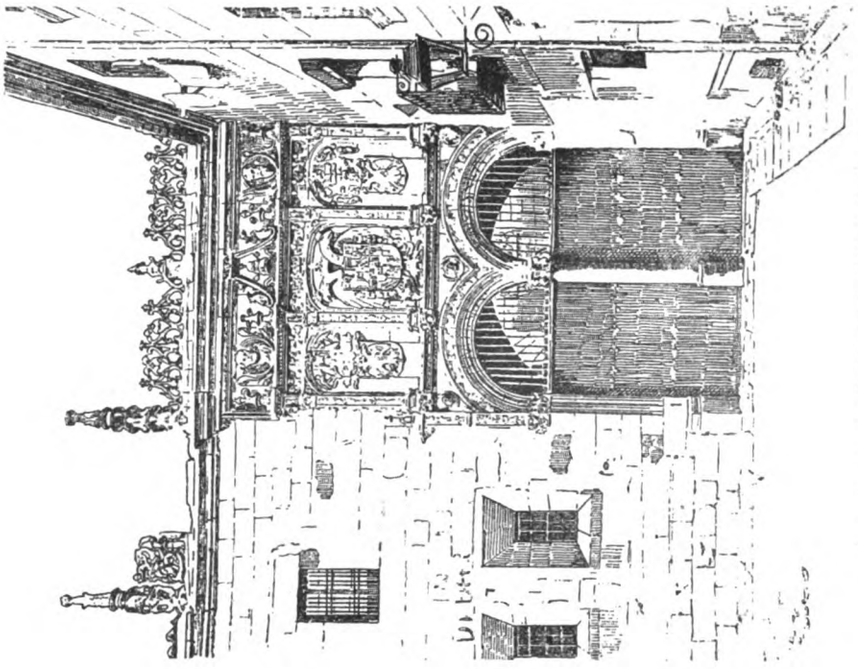
Agents at all Central Points.

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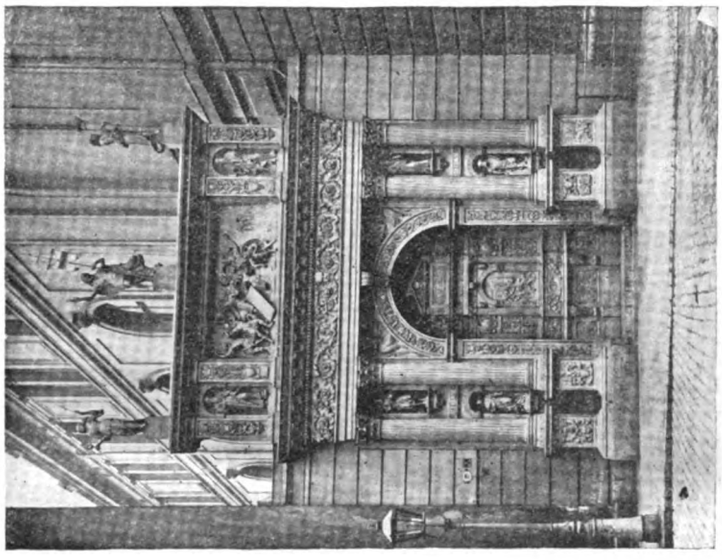
DOORWAYS.



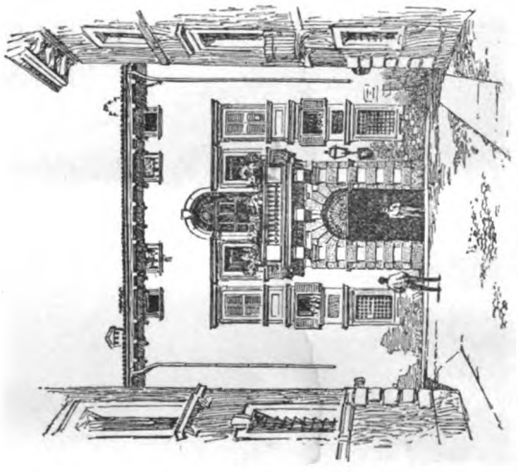
Doorway at Serignac, France.



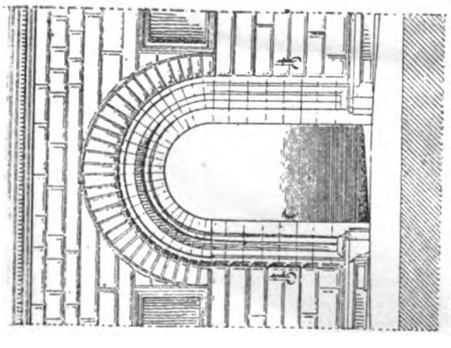
Gateway near the University of Salamanca, Spain.



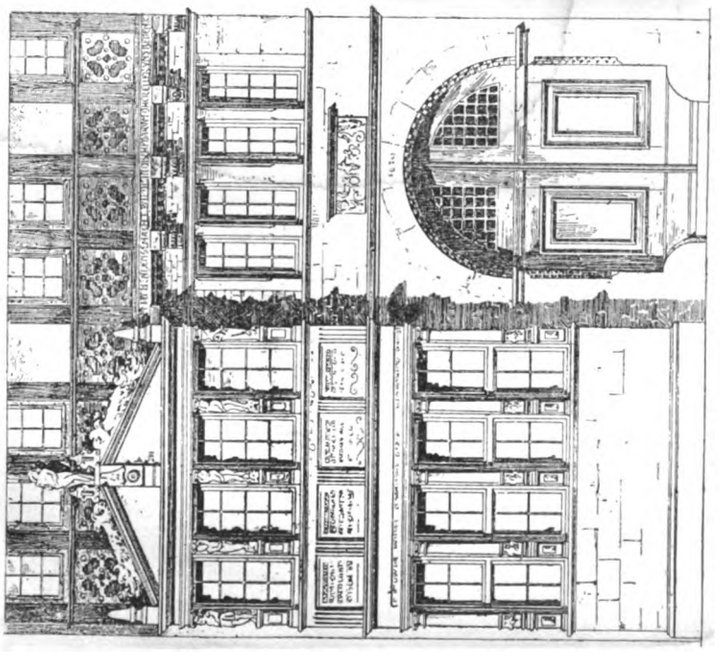
Old Chapel Portal, Dresden, Germany.



Palazzo Ottolini, Verona, Italy.



Strozzi Palace, Florence, Italy.



Façade at Hanover, Germany.

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The Heliotype Printing Co.

LITHOGRAPHERS, ETC.

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Boston

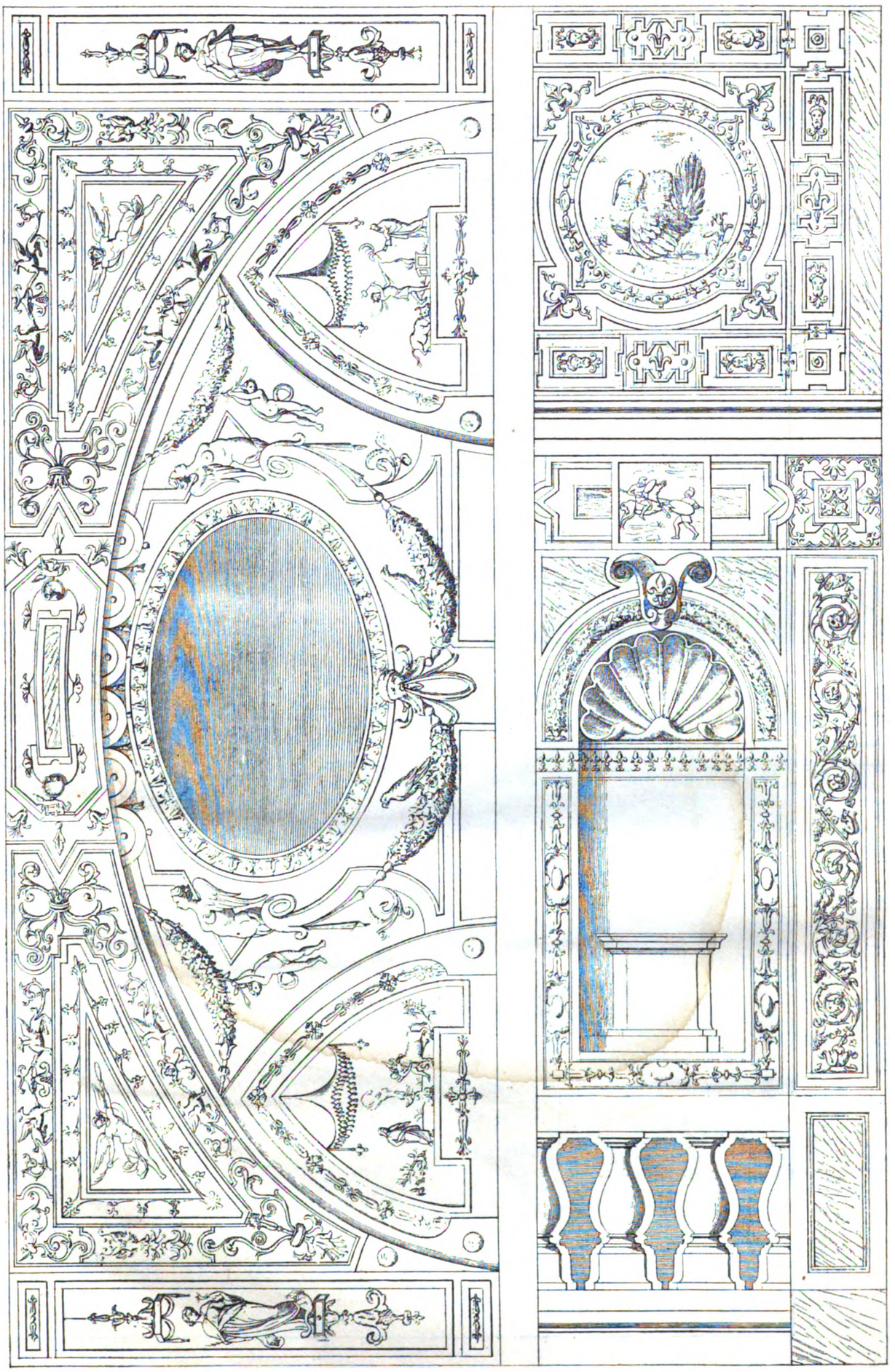
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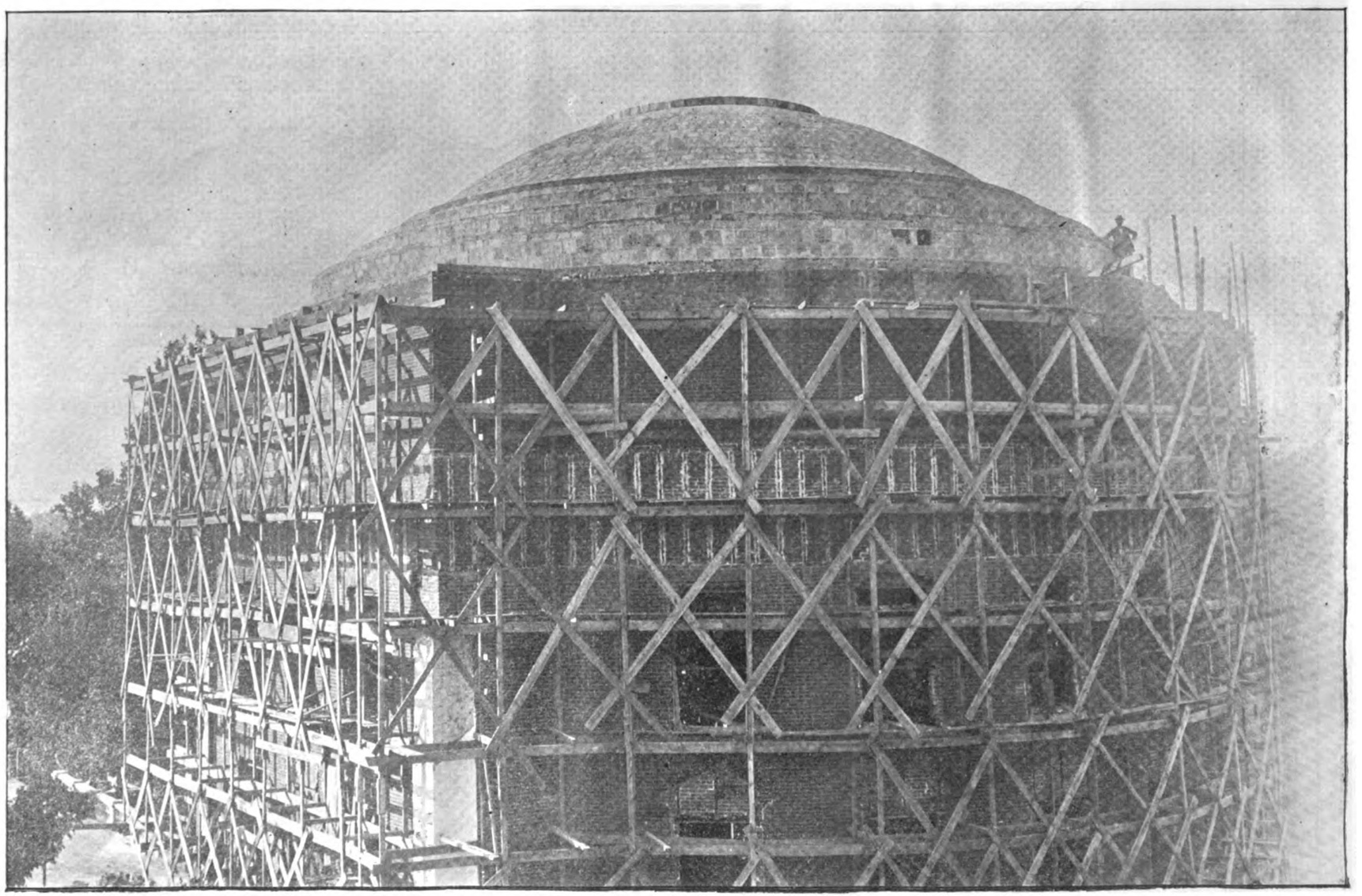
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Palazzo Farnese, Caprarola, Italy.

PAINTINGS BY TEMPESTI, IN THE LOGGIA OF THE MAIN STORY.

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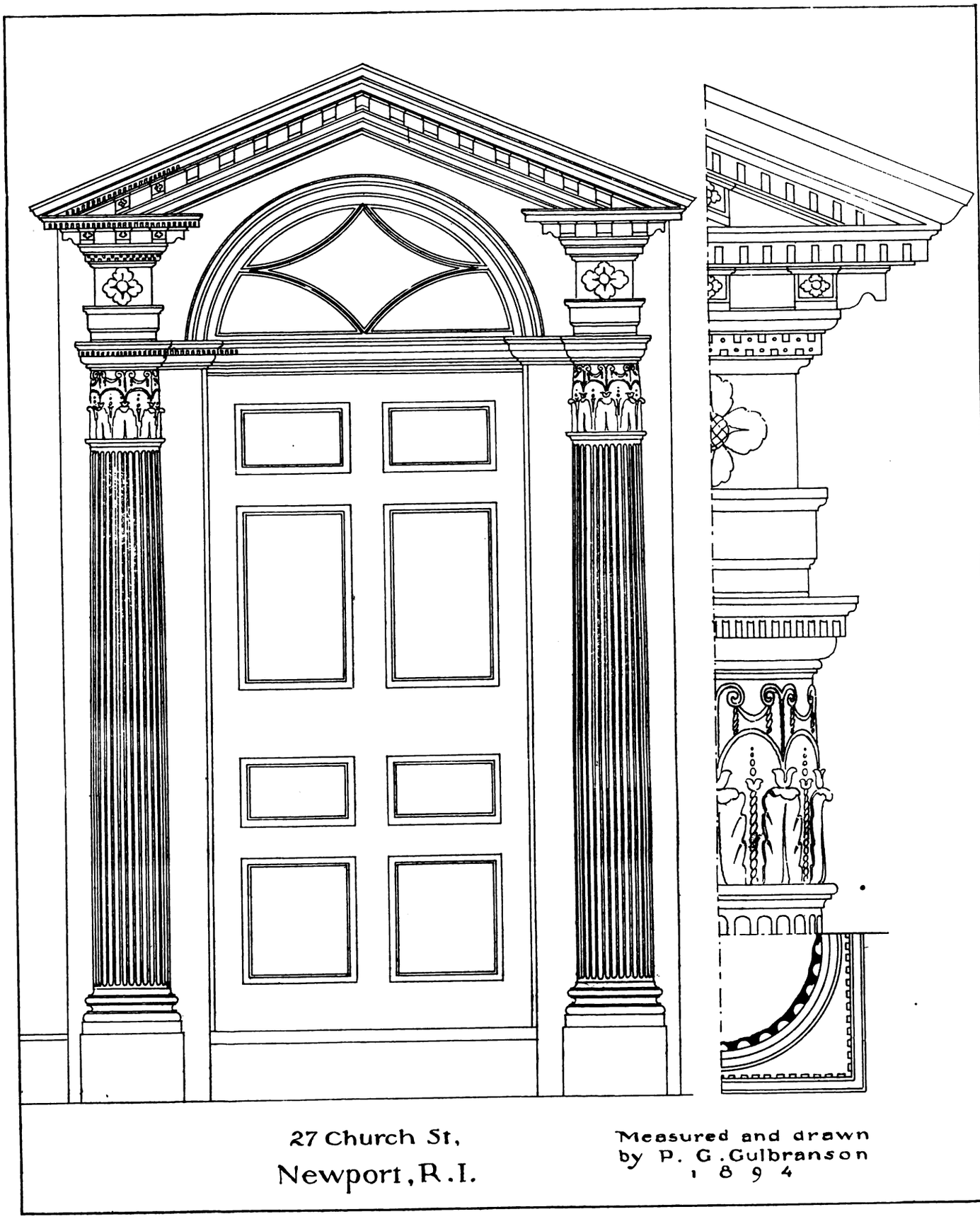
DOME OVER ROTUNDA OF LIBRARY BUILDING, UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE, VA. McKIM, MEAD & WHITE, Architects.

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BOSTON OFFICE:
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27 Church St,
Newport, R.I.

Measured and drawn
by P. G. Gulbranson
1894

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POTSDAM RED SANDSTONE.

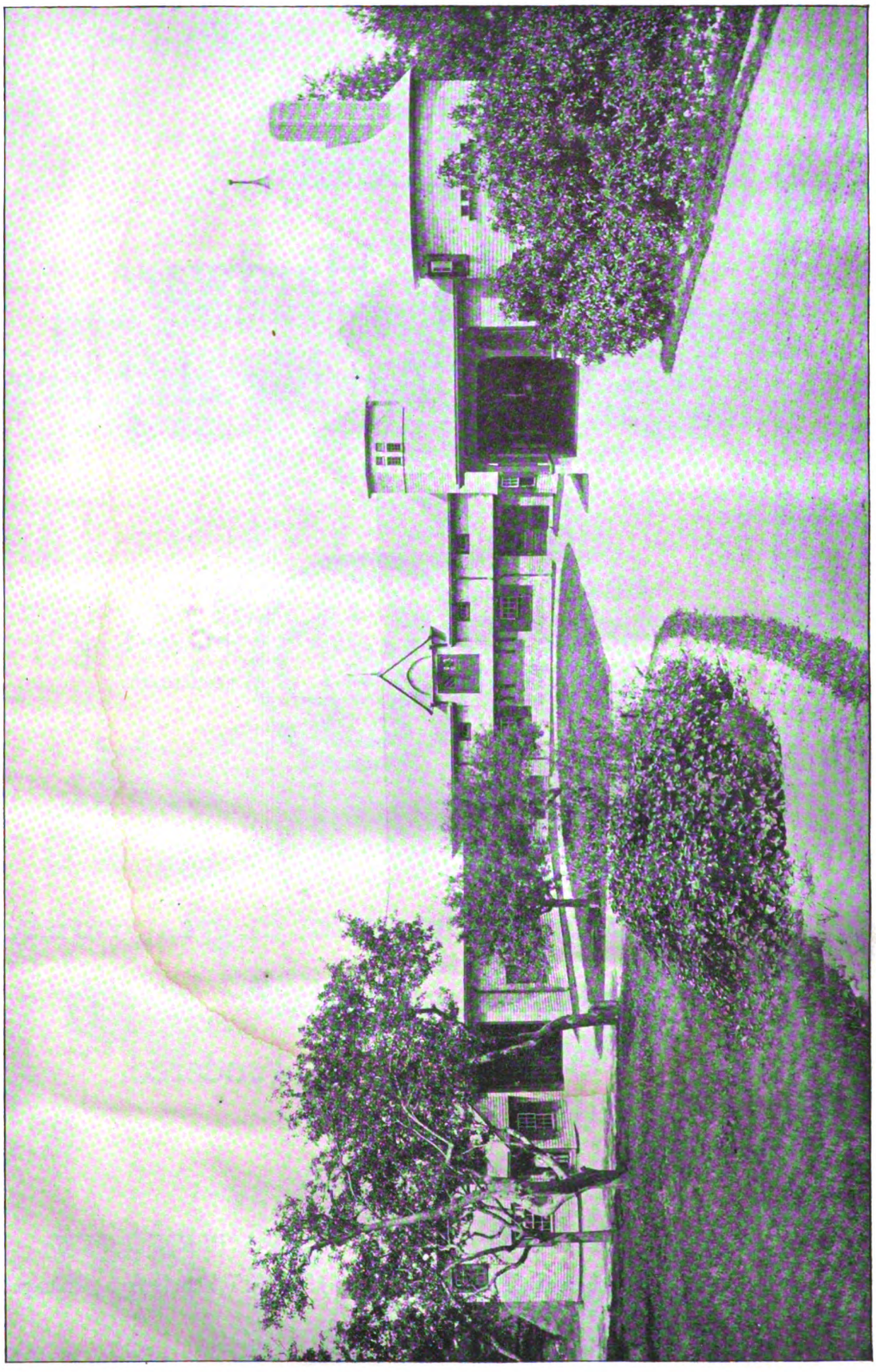
Not the least of the advantages of this stone is the fact that cement and mortar have a very strong hold upon it, making anchors for wall facings unnecessary. There is no tendency for the pointing at joints of stonework to be thrown out by frost. In many varieties of stone and particularly limestone and marble, water in running down the wall gets between the surface of the stone and the mortar, the pointing is soon loosened, and the wall left open to the attacks of the weather. We can refer to masonry which has stood but a few years in which the pointing has been thrown out by the weather to a depth of from one to four inches. Re-pointing is not only expensive, but if a wall really needs it, it cannot be made as good as new, besides the face of the wall is often defaced by this process.

It is largely on account of this quality of the stone which causes it to hold its place in a tile floor, and tiling of Potsdam stone cannot be loosened from its bed by the running of heavy hand-trucks or barrows over it, whether these have rubber wheels or not.

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School—Empire.
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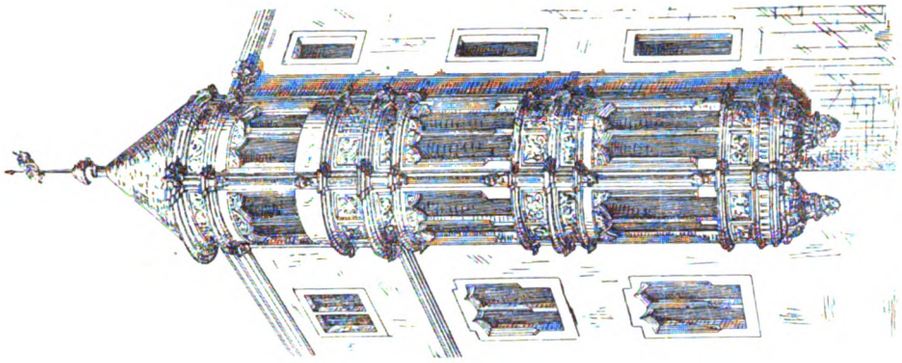
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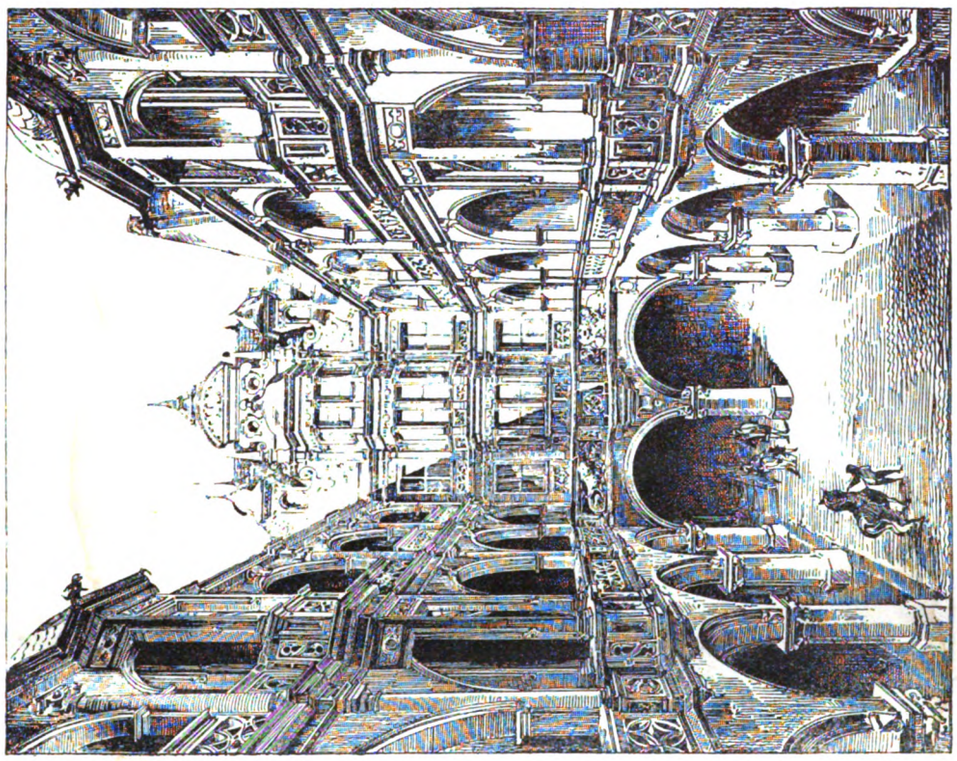
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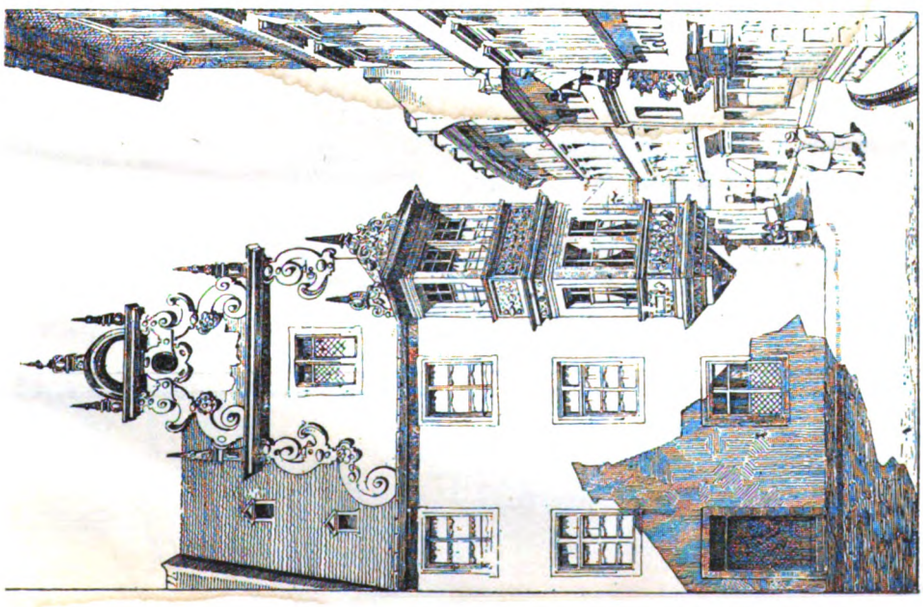
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Angle Turret, Schloss Hartenfels, Torgau, Germany.



Peller's House, Nuremberg, Germany.



Gymnasium, Mayence, Germany.

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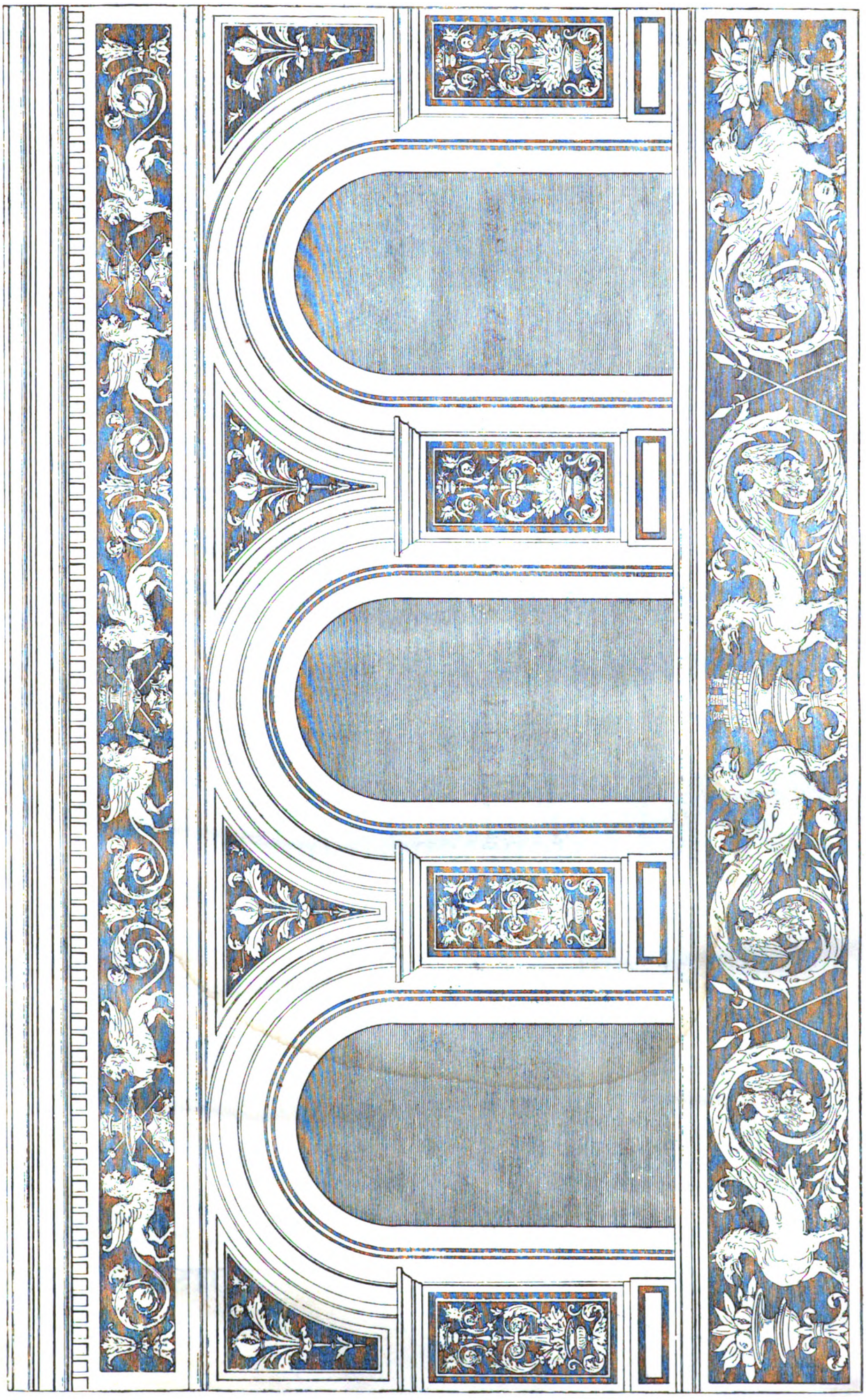
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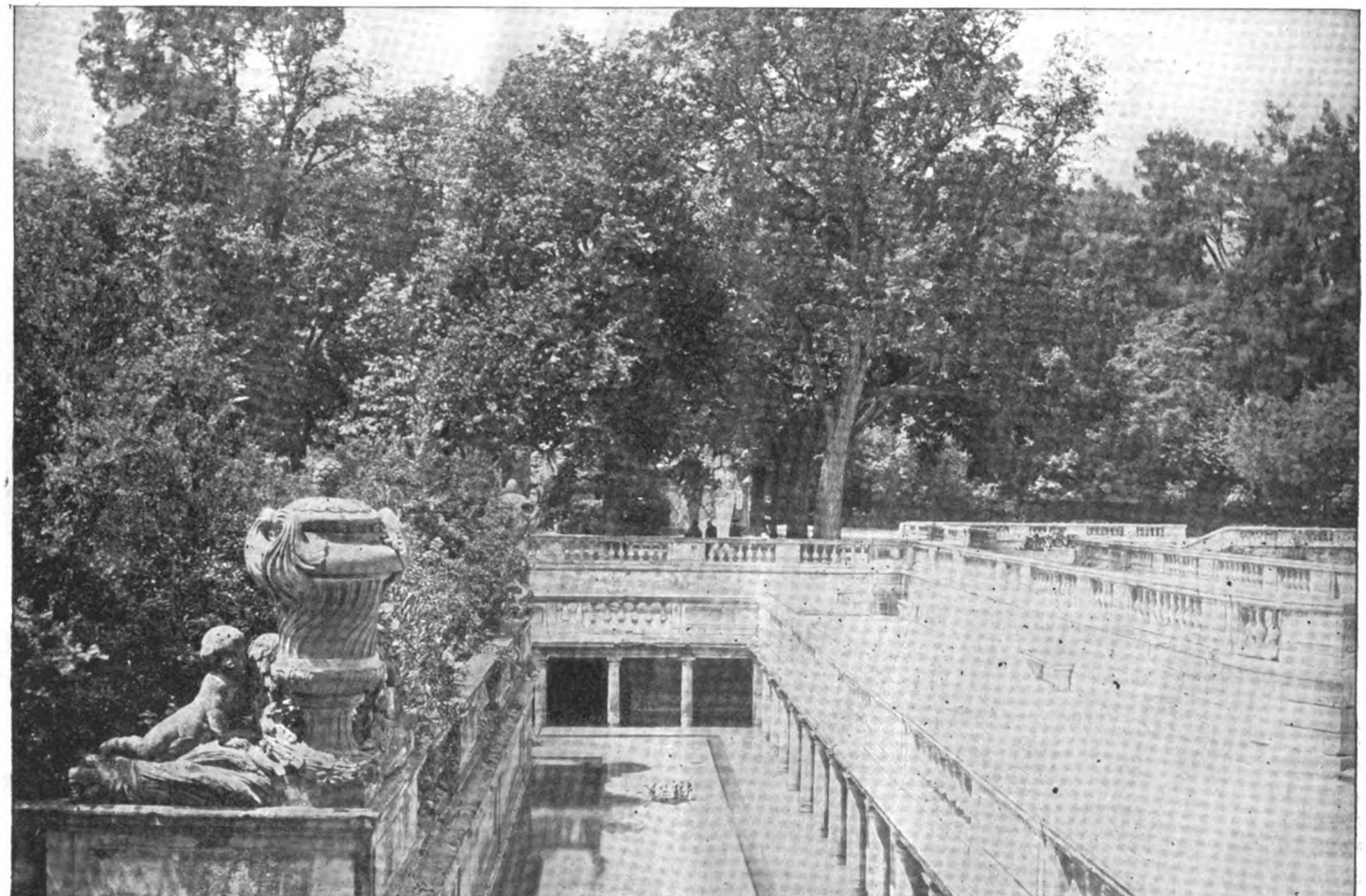
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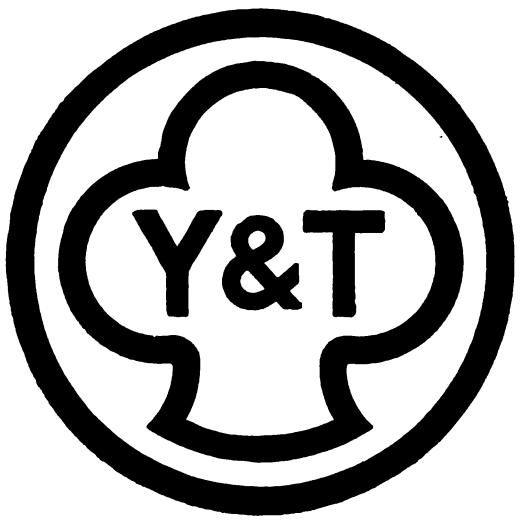
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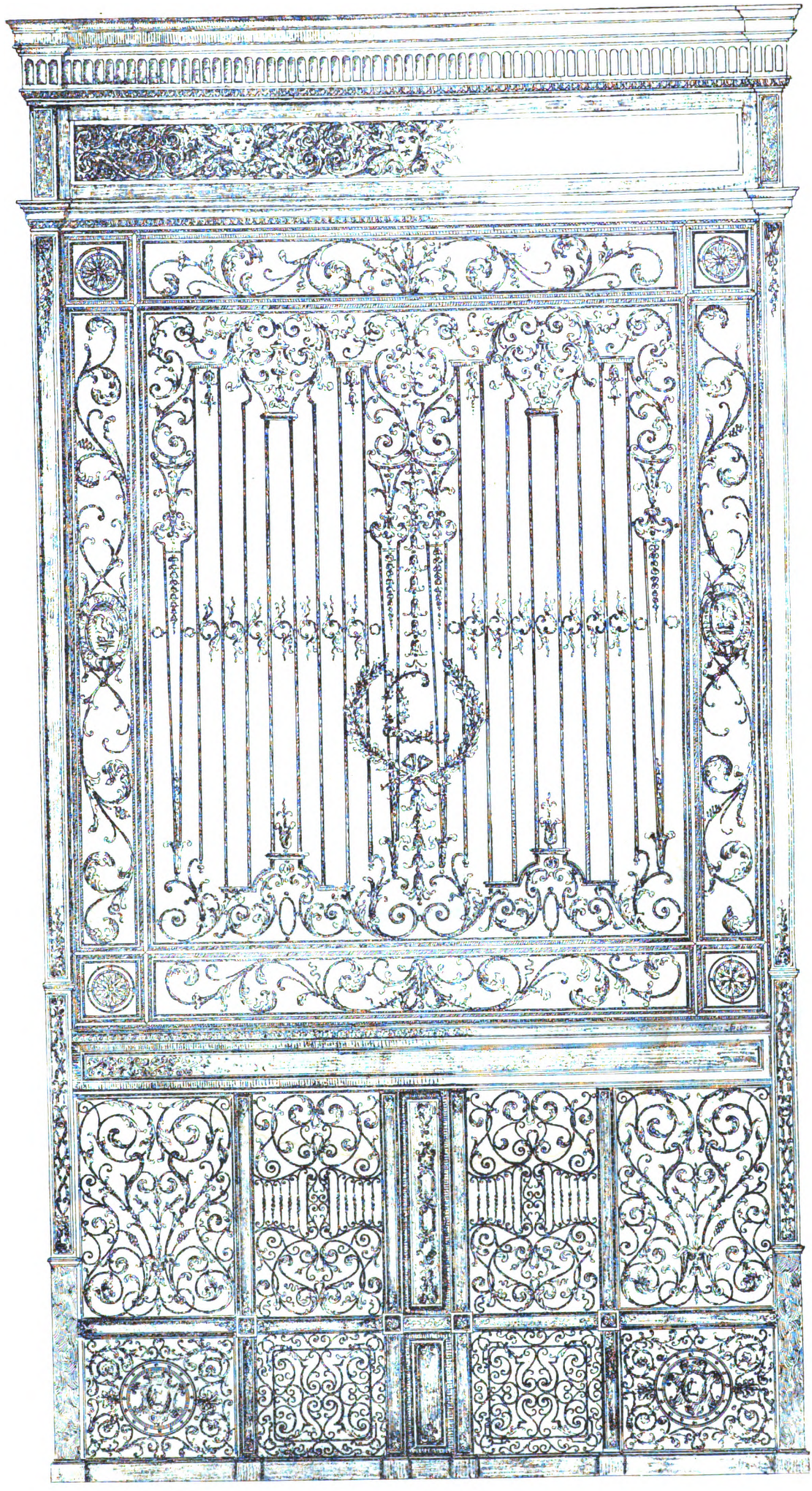
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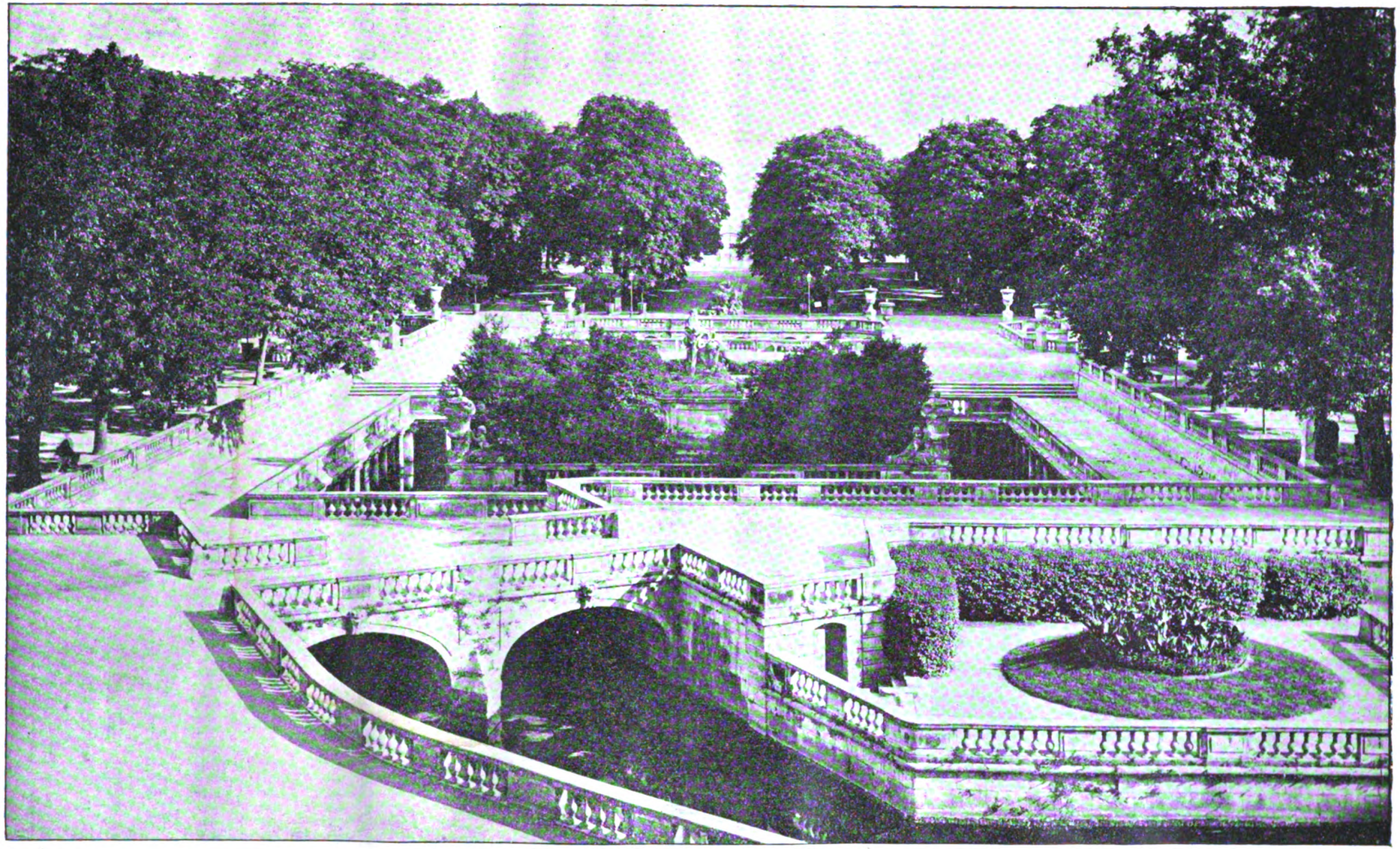
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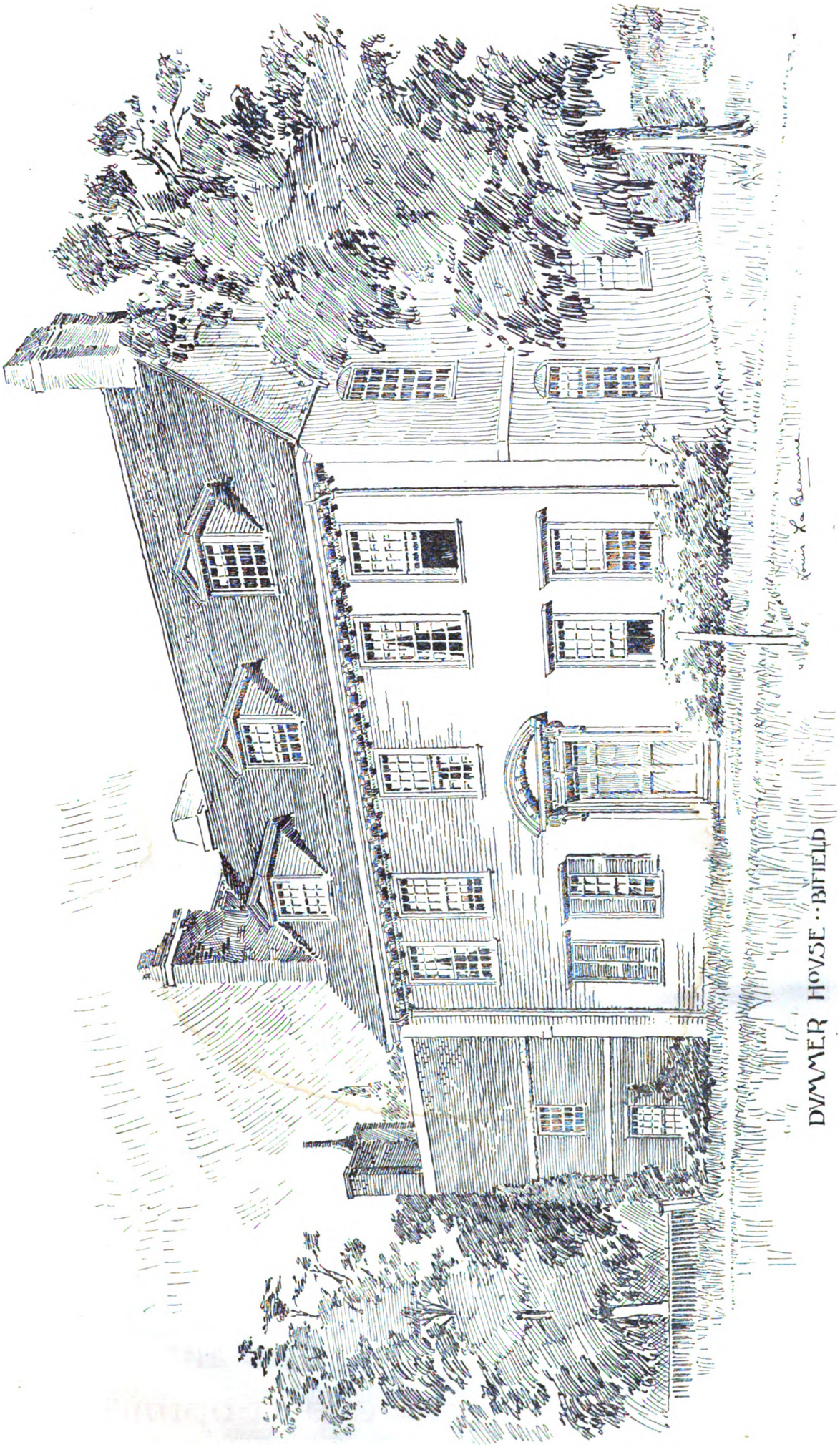
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> "I consider this, from the standpoint of durability, almost an ideal stone. Composed wholly of quartz grains, it has by deposition of interstitial silica, become converted into a compact quartzite, impregnated with just enough iron oxide to give it a reddish, or brownish-red color. It is, therefore, practically non-absorptive, and its surface affords no foothold for growing organism. Strong as the strongest granite, and not liable to chemical disintegration from atmospheric agencies, the stone deserves even a wider recognition than it has yet received." Page 273.

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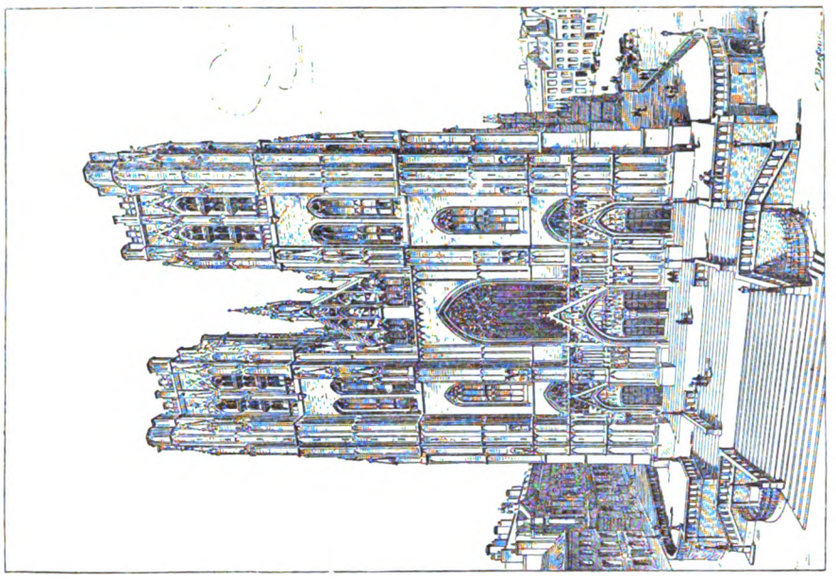
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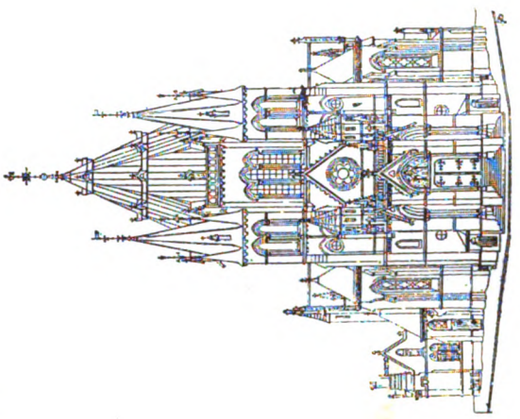
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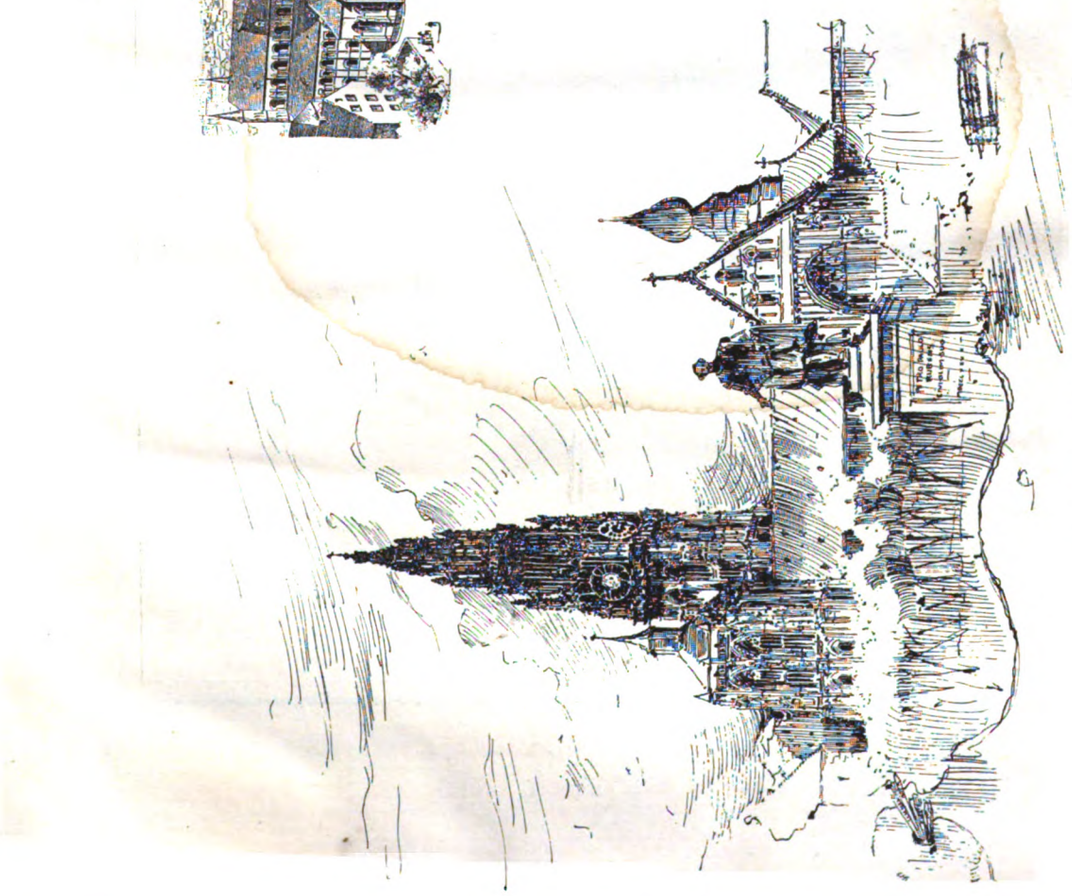
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Cathedral of Tournai.



Church of Bon Secours.
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Antwerp Cathedral.

BELGIAN CHURCHES.

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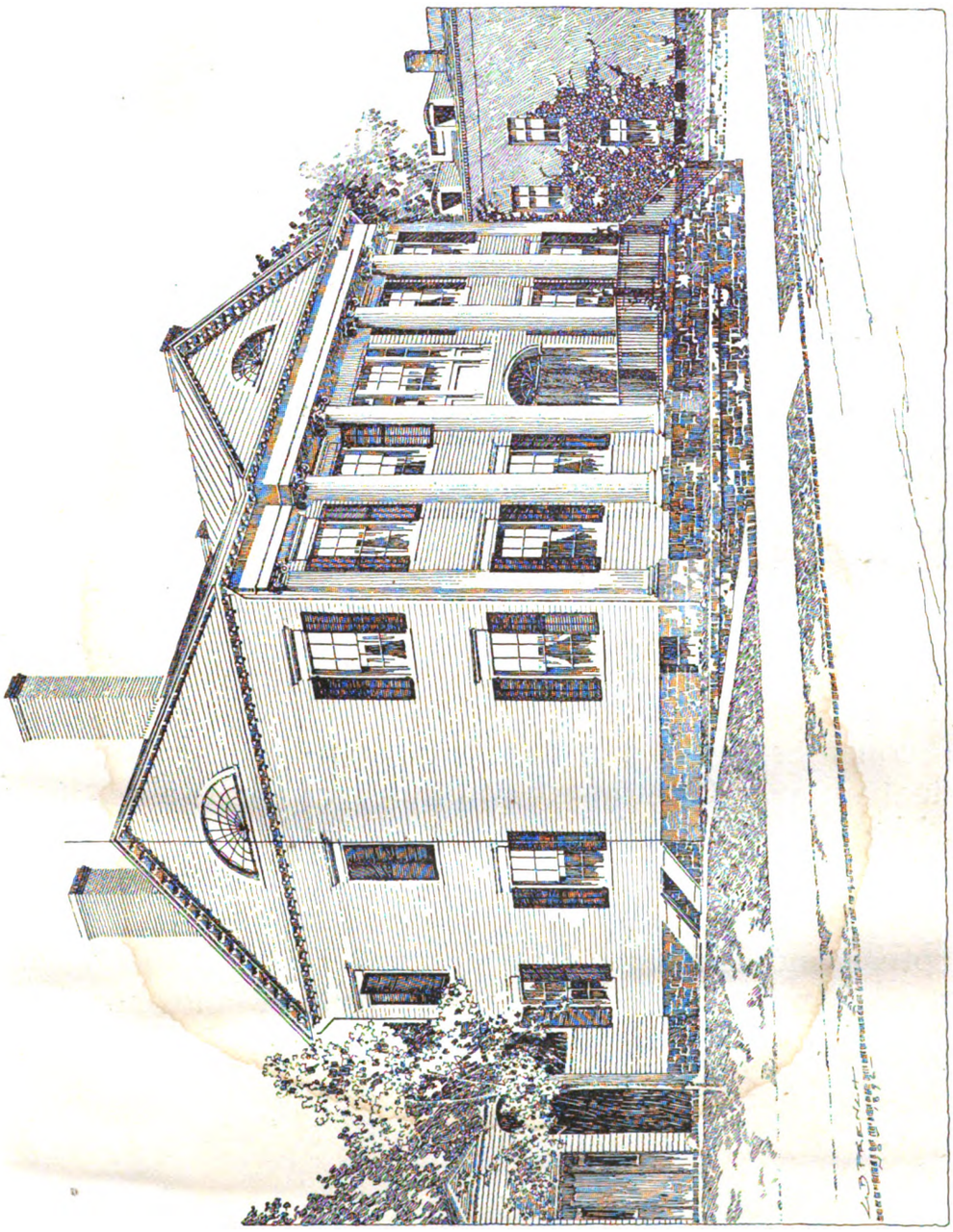
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House on Elm Street, New Haven, Conn., Built in 1815.

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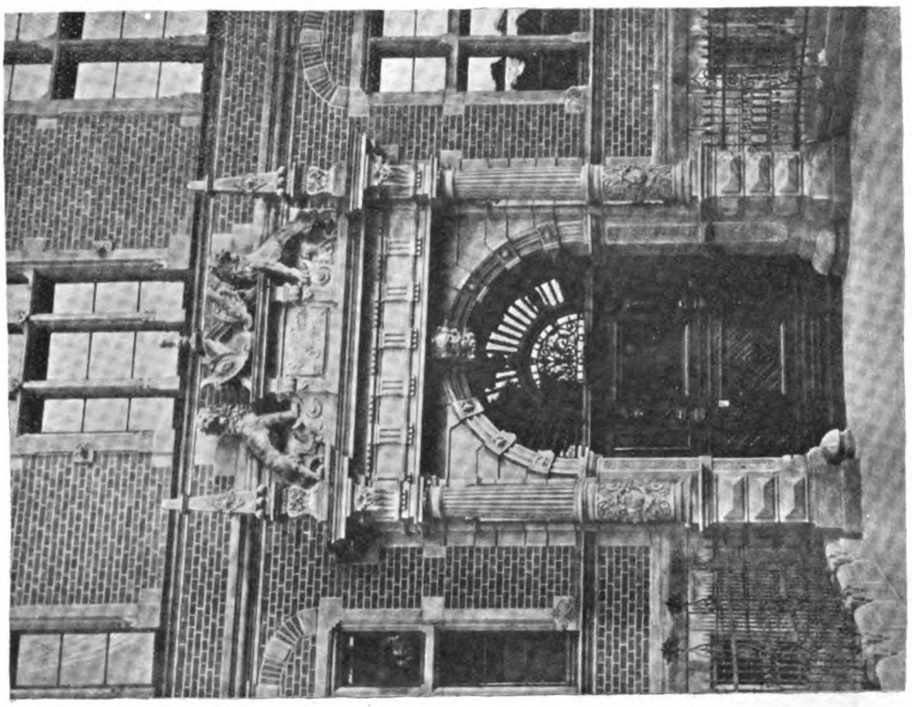
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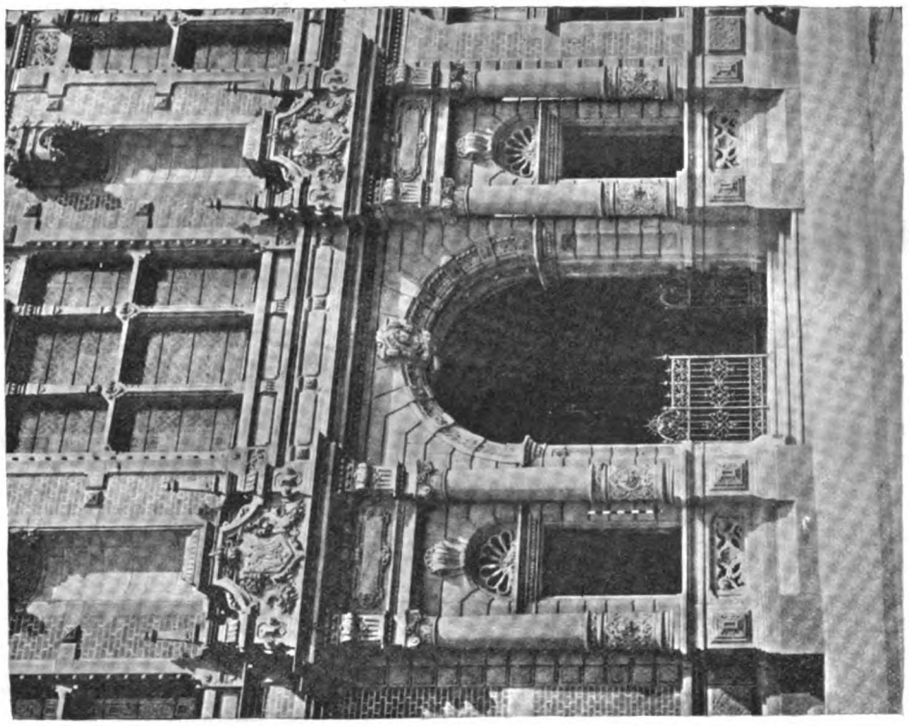
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Side Entrance: Law Courts, Cologne, Prussia.



Main Entrance, South Front: Law Courts, Cologne, Prussia.

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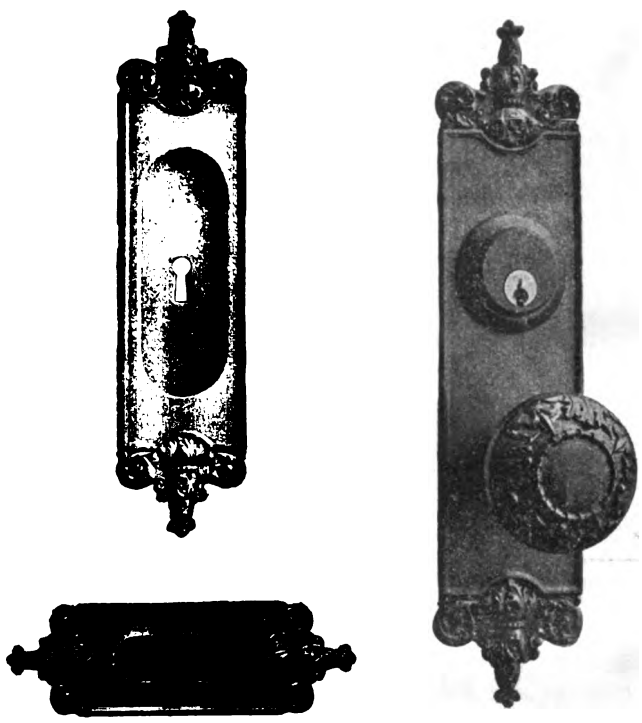
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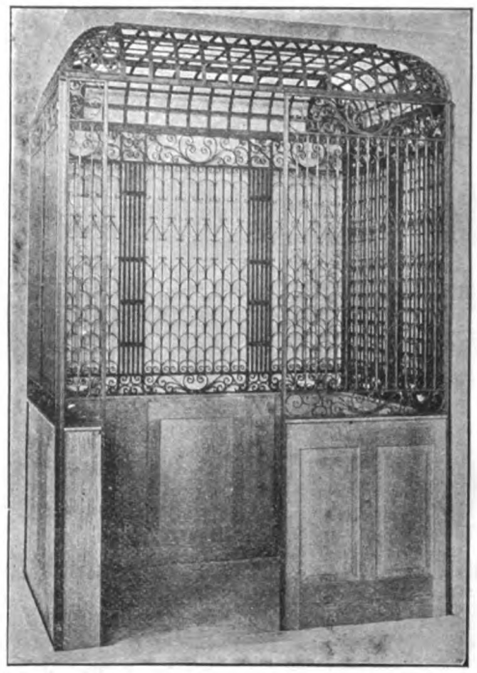
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Graves Elevator Co.....[*Elevators.*]
Wood-Mosaic Co. .....[*Hardwood Floors.*]

Rome.
Wilson, R. M.....[*Bath tubs.*]

NEW YORK.

Schenectady.
General Electric Co..[*Electrical Equipments.*]

Troy.
Globe Ventilator Co.....[*Ventilators.*]
Troy Laundry Machinery Co...[*Washing Machines.*]

OHIO.

Cleveland.
Brooks, T. H. & Co.....[*Sidewalk Lights.*]
Cudell, F. E.....[*Traps.*]
Van Wagoner & Williams Hardware Co.....[*Spring Hinges.*]

Toledo.
Tobey Water-heater & Mfg. Co.....[*Automatic Water-heater.*]

PENNSYLVANIA.

Ambler.
Keasbey & Mattison Co..[*Magnesia Covering.*]

Bangor.
Bangor Roofing Slate Mfrs. Asen.....[*Roofing Slate.*]

Easton.
Bangor Excelsior Slate Co....[*Roofing Slate.*]

Harrisburg.
Harrisburg Fn'dy & Machine W'ks..[*Engines.*]

Philadelphia.
Baily & Truscott.....[*Architects.*]
Belmont Iron Works.....[*Ironwork.*]
French & Co., Samuel H.....[*Mortar Colors.*]
Haines, Jones & Cadbury Co...[*Plumber's Supplies.*]
Hall & Co., Edwin.....[*Cement.*]
Jarden Brick Co.....[*Bricks.*]
Manning, W. T.....[*Filters.*]
Merchant & Co.....[*Tin Roofing.*]
Morse, Williams & Co.....[*Elevators.*]
Phœnix Iron Co.....[*Structural Iron.*]
Taylor Co., N. & G.....[*Tin.*]
Thorn, J. S. Co.....[*Sheet Metal.*]
Thorn Shingle & Ornament Co.....[*Metallic Shingles.*]

Pittsburgh.
Apollo Iron and Steel Co...[*Galvanized Iron.*]
Follansbee Bros. Co.....[*Roofing Materials.*]
Miller Co., W. Gordon.....[*Traps.*]
Northrop & Co., A.....[*Metal Ceiling.*]
Pittsburgh Terra-Cotta Lumber Co.....[*Fireproofing.*]

Scranton.
International Correspondence Schools, The [illegible].....

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Congregational Church, Ashland, Ohio.



First Congregational Church, Norwood, Mass.



Methodist Church, Burnside, Conn.



Avery House, Pequonnock, Conn.



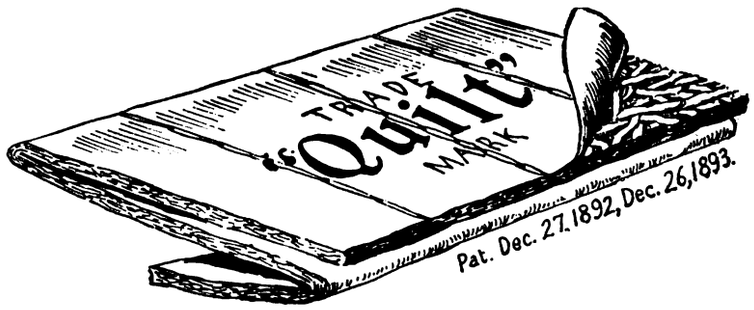
St. Boniface's, Bonchurch, Isle of Wight, England.



Puritan Congregational Church, Wilkes Barre, Pa.

COUNTRY CHAPELS.

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Light, Sound-Proof Construction

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SAMPLES SENT ON APPLICATION.

SAMUEL CABOT, Sole Manufacturer,

BOSTON, MASS.

Agents at all Central Points.

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Palazzo Farnese, Caprarola, Italy: Paintings in the upper part of the Grand Staircase executed by Tempesti.

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Potsdam Red Sandstone

Samples of Tiling GROUND AND SQUARED BY AUTOMATIC MACHINERY ARE NOW READY, AND SPECIMENS FOUR INCHES SQUARE WILL BE FORWARDED TO ARCHITECTS, PREPAID, ON REQUEST.

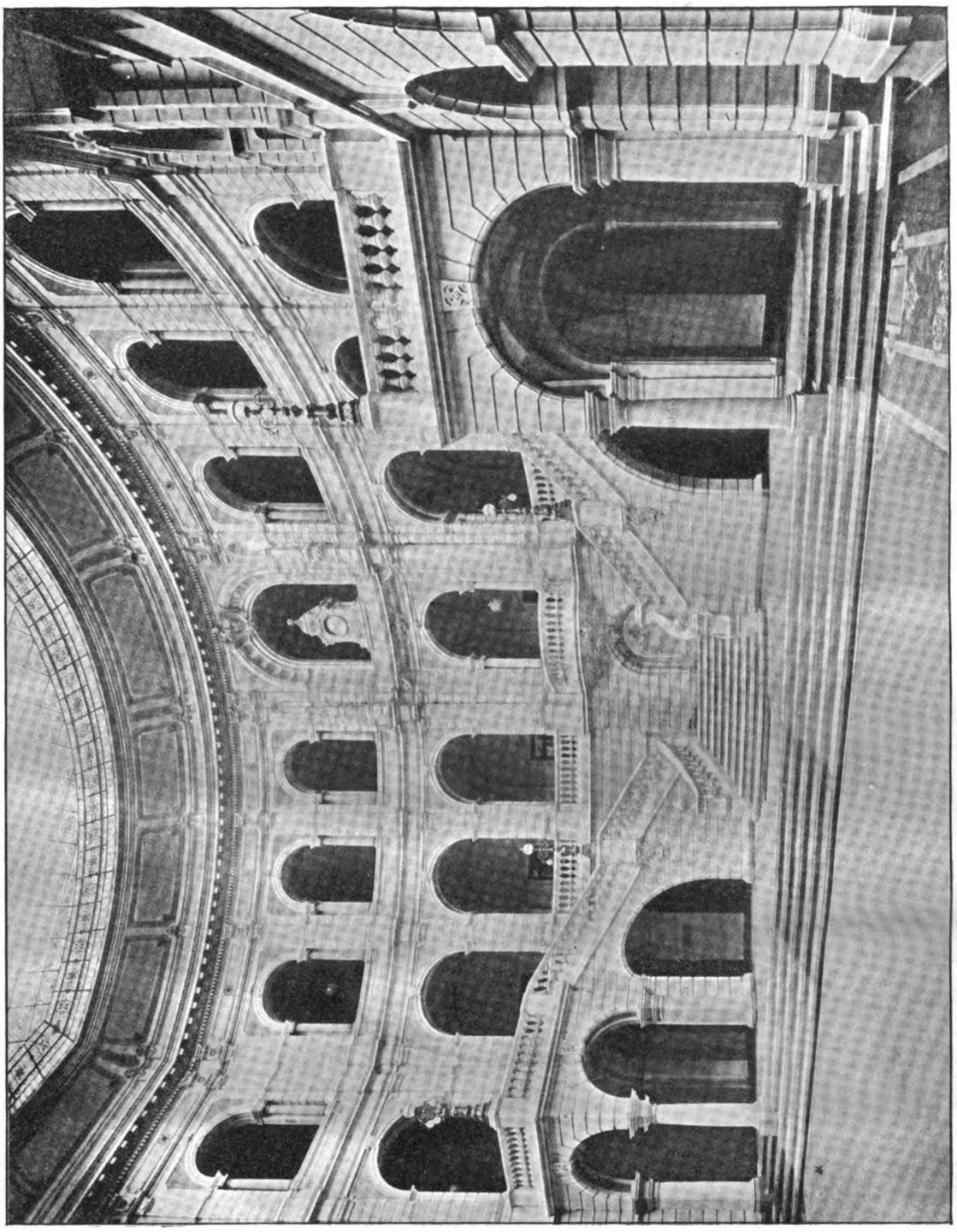
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These Tiles ARE ALREADY SPECIFIED FOR MUCH IMPORTANT WORK.

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Waiting-room, South Wing: Law Courts, Cologne, Prussia.

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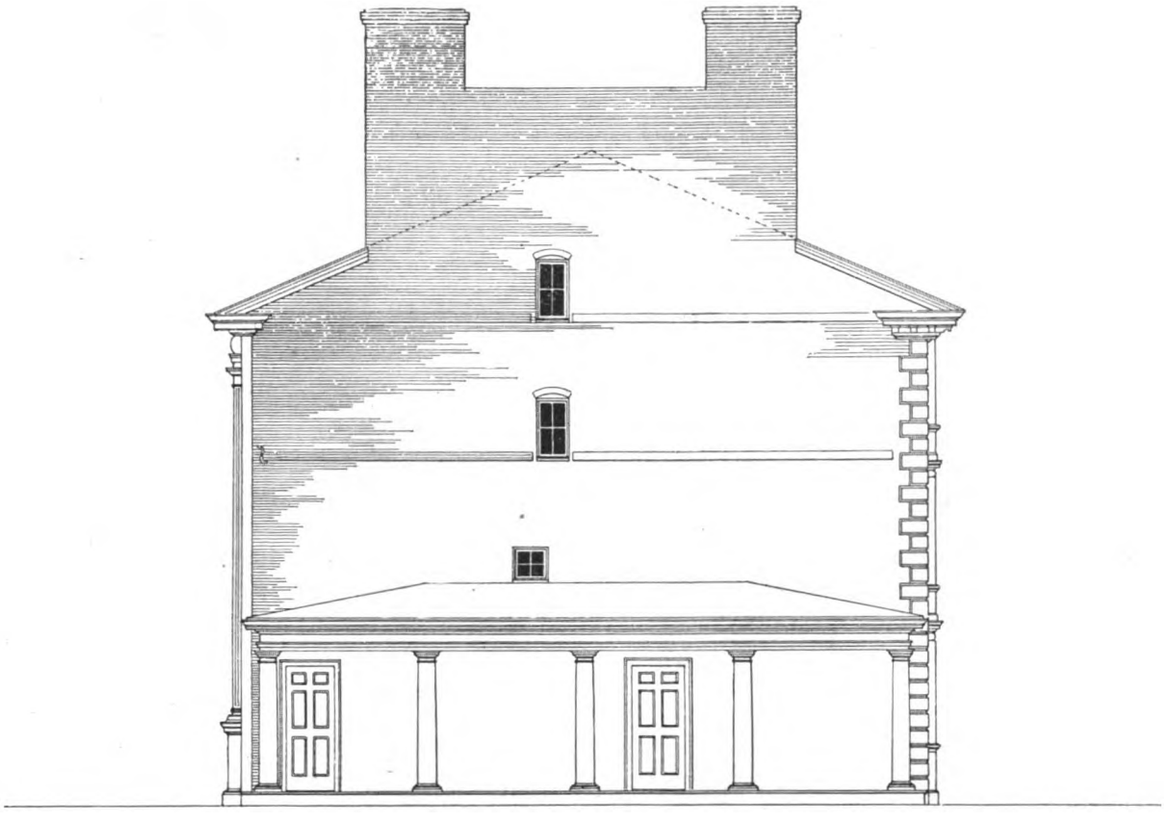
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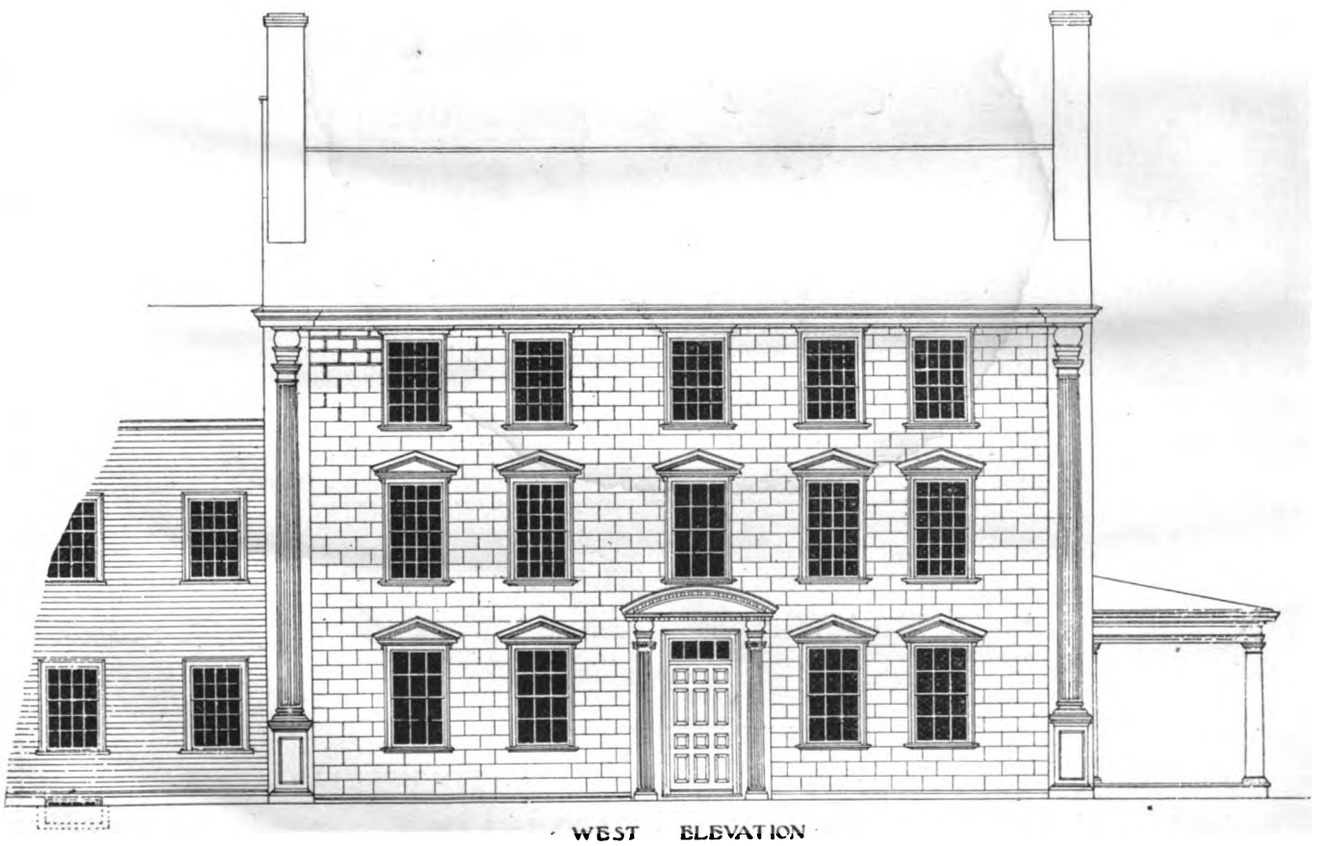
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SOUTH ELEVATION



WEST ELEVATION

ROYAL HOUSE, MEDFORD, MASS.

MEASURED AND DRAWN BY MESSRS. A. C. FERNALD AND F. C. ADAMS.

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The Yale Locks,

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Art Metal Work.



ORNAMENTATION—EPHESUS.
SCHOOL—GREEK.
No. 401½, Escutcheon Plate and Knob. No. 854, Cup Escutcheon.
No. 1349, Flush Sash Lift.

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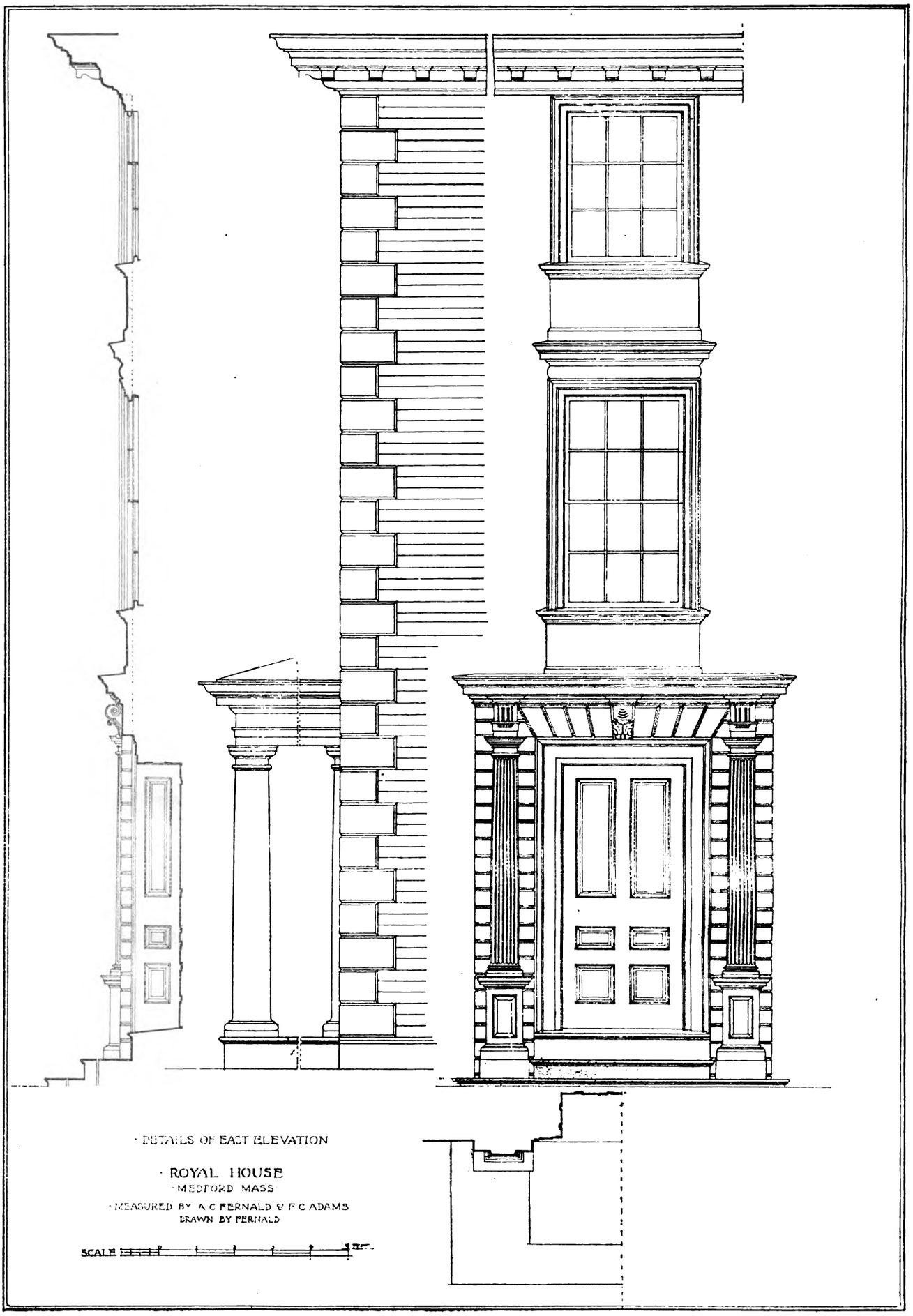
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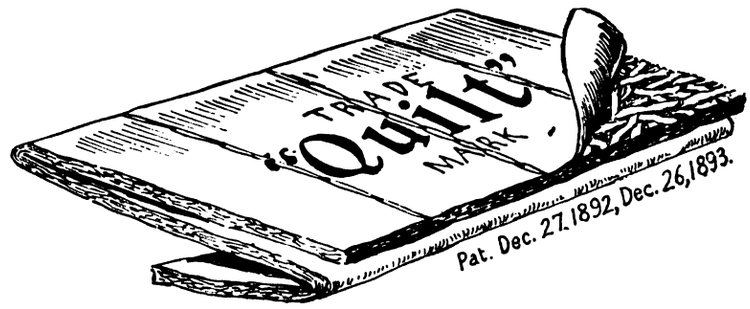
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Light, Sound-Proof Construction

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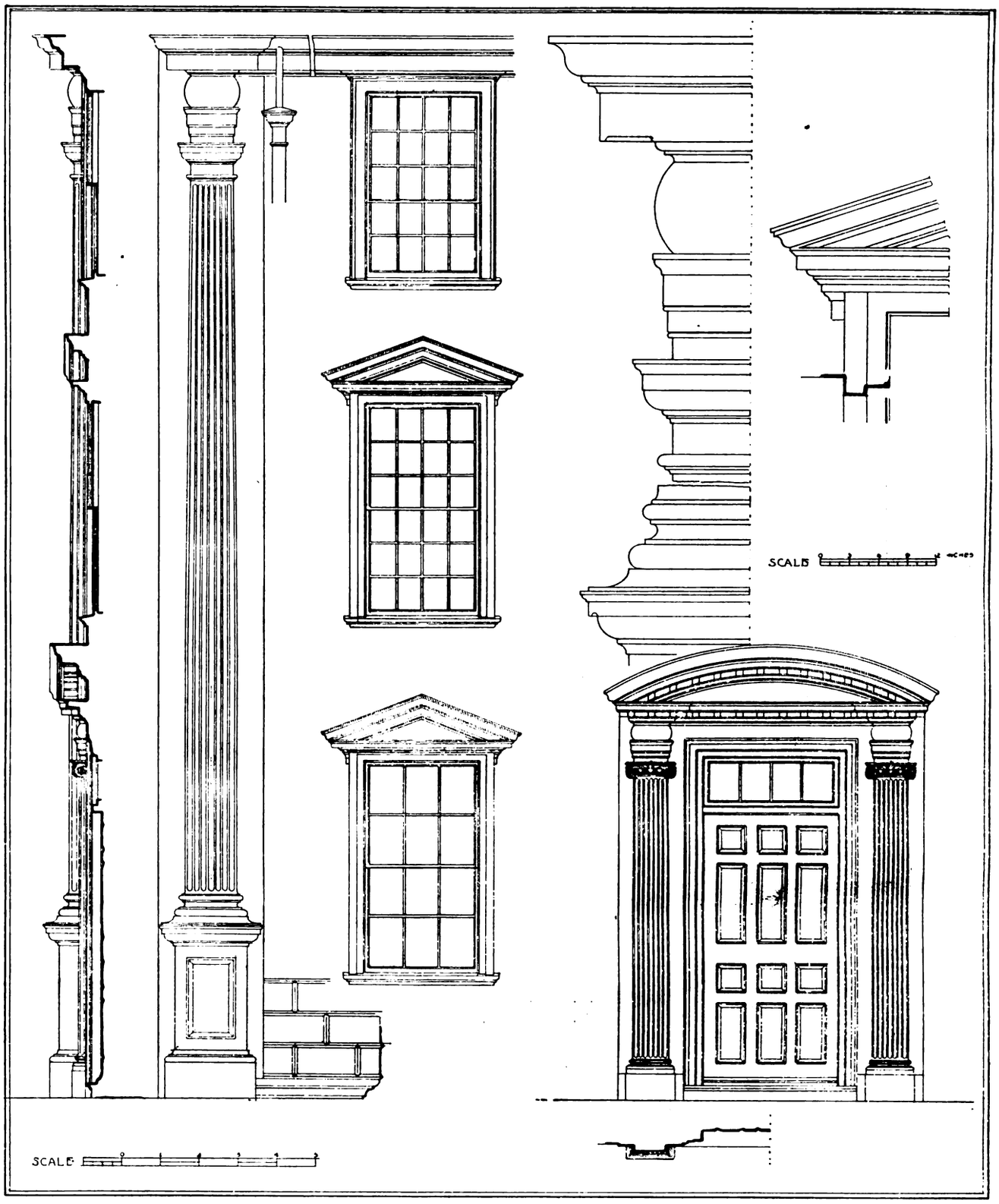
SAMPLES SENT ON APPLICATION.

SAMUEL CABOT, Sole Manufacturer,

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DETAILS OF WEST ELEVATION, ROYAL HOUSE,
MEDFORD, MASS.
MEASURED AND DRAWN BY A. C. FERNALD AND F. C. ADAMS.

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Potsdam Red Sandstone

⚜ ⚜ ⚜

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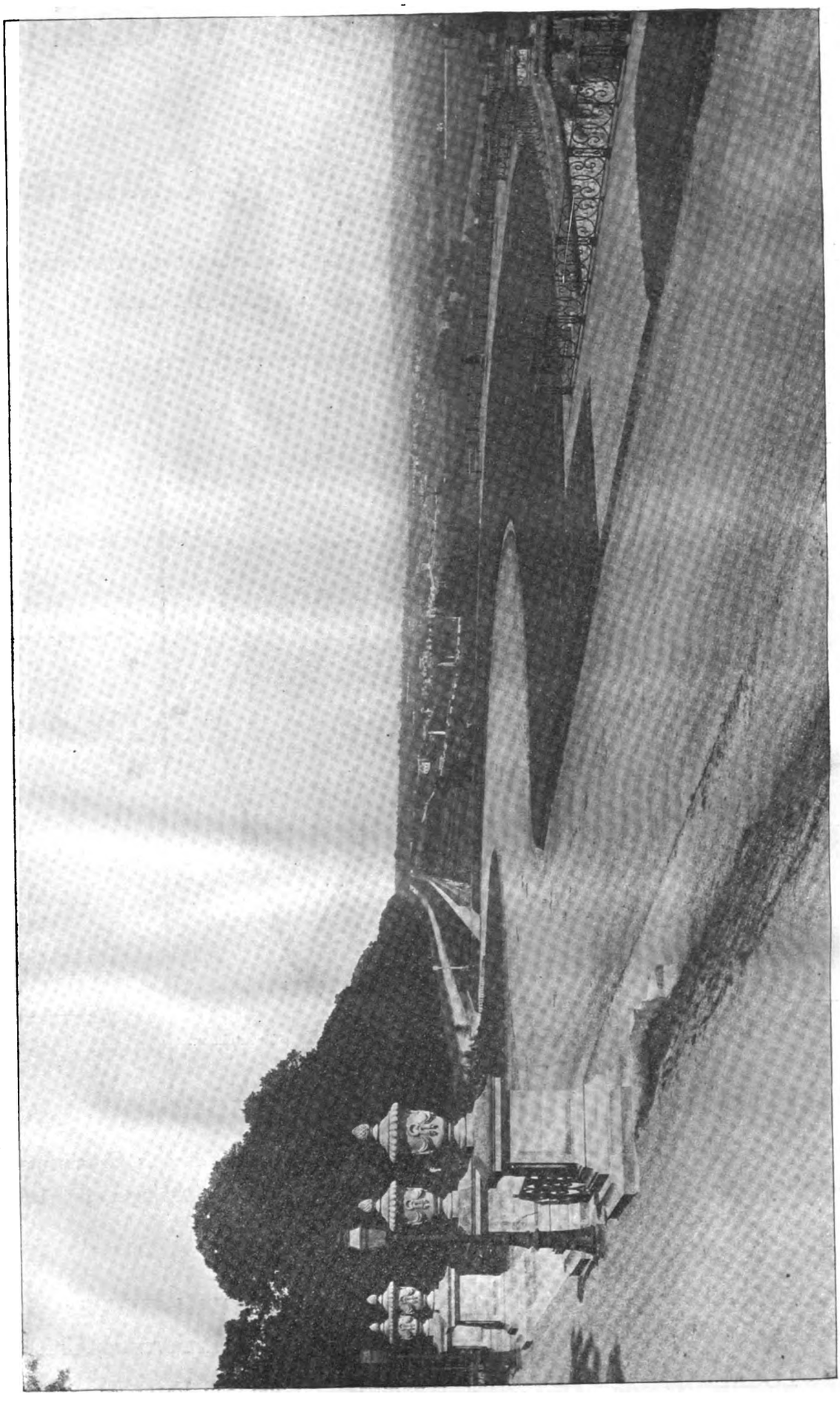
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The Potsdam Red Sandstone Co.,

POTSDAM, N. Y.

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXXVII.



THE TERRACE: ST. GERMAIN-EN-LAYE, FRANCE.

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The Art Metal Work

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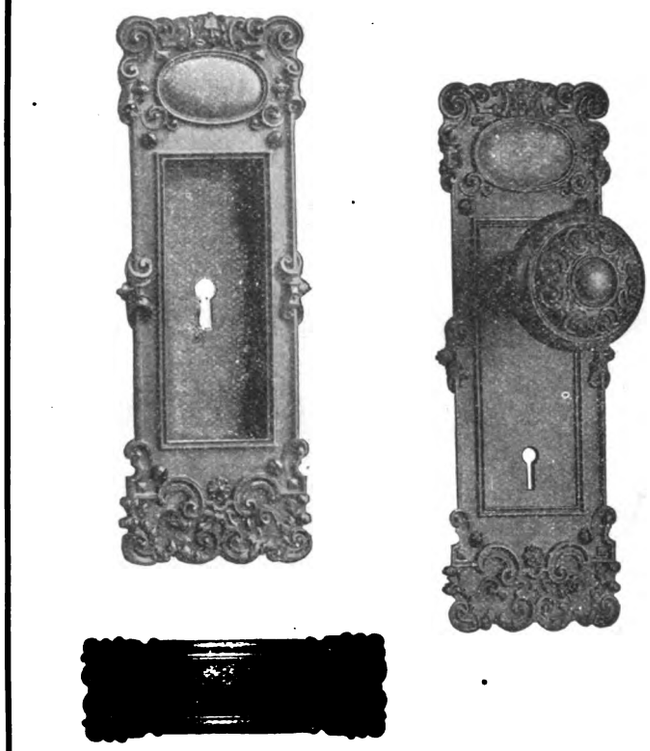
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ORNAMENTATION—STRATFORD.

SCHOOL—ELIZABETHAN.

No. 410, Escutcheon Plate and Knob. No. 854, Cup Escutcheon.
No. 1349, Flush Sash Lift.

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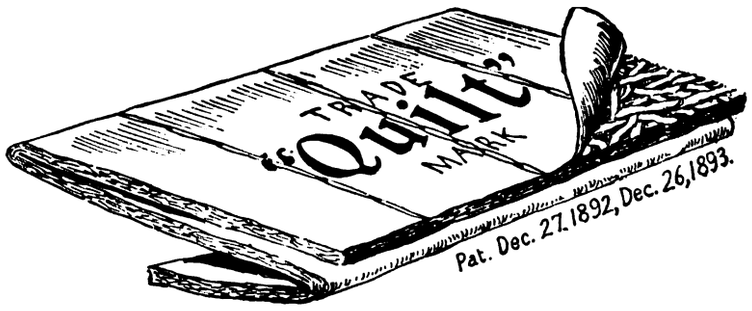
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The Court of Honor, World's Columbian Exhibition, Chicago, Ill.

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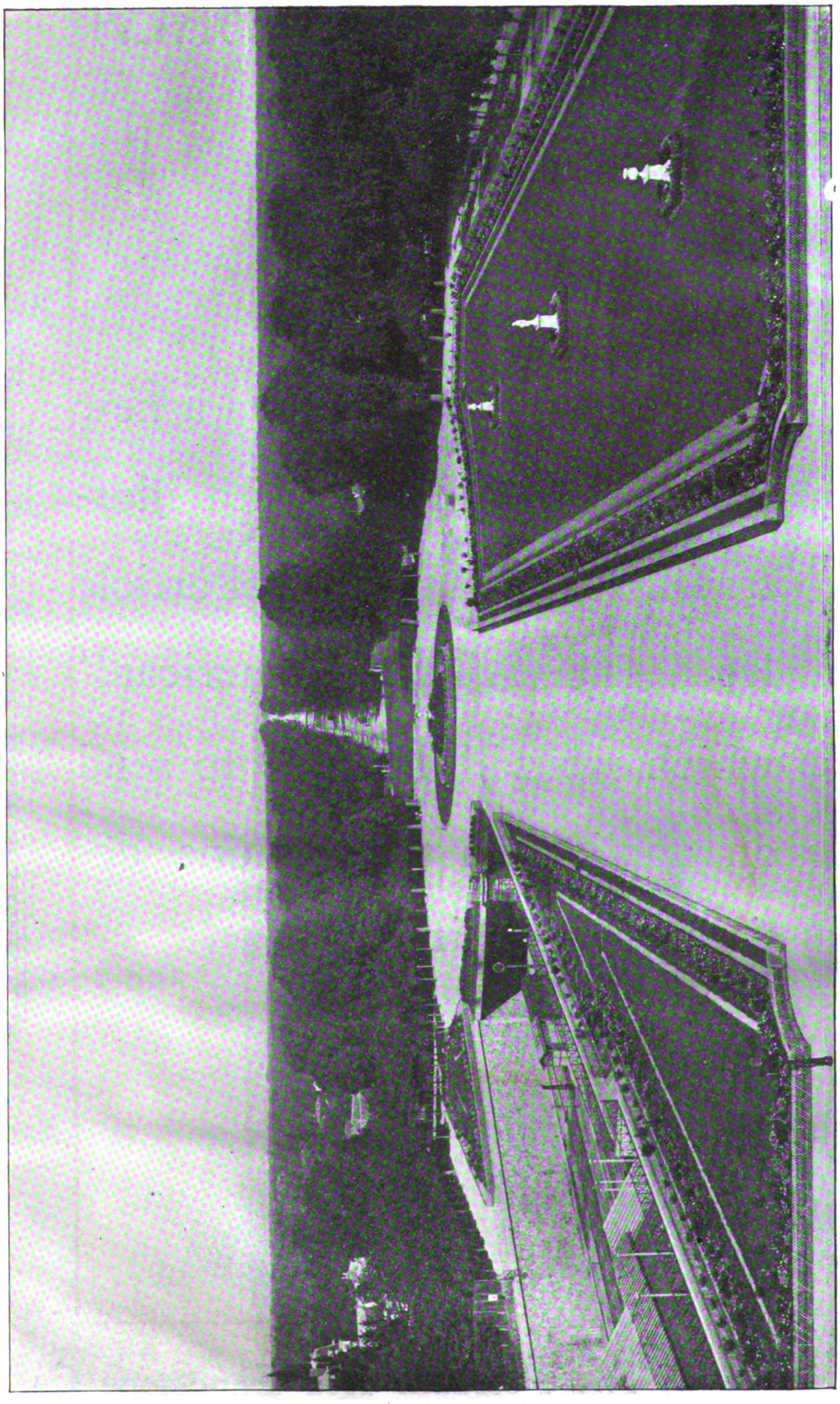
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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXXVIII.



AVENUE DES LOGES: ST. GERMAIN-EN-LAYE, FRANCE.

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POTSDAM RED SANDSTONE.

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We have lately issued a new pamphlet re-printed with illustrations from an editorial article from "The Scientific American" which we will be glad to send on application to any one desiring to examine it.

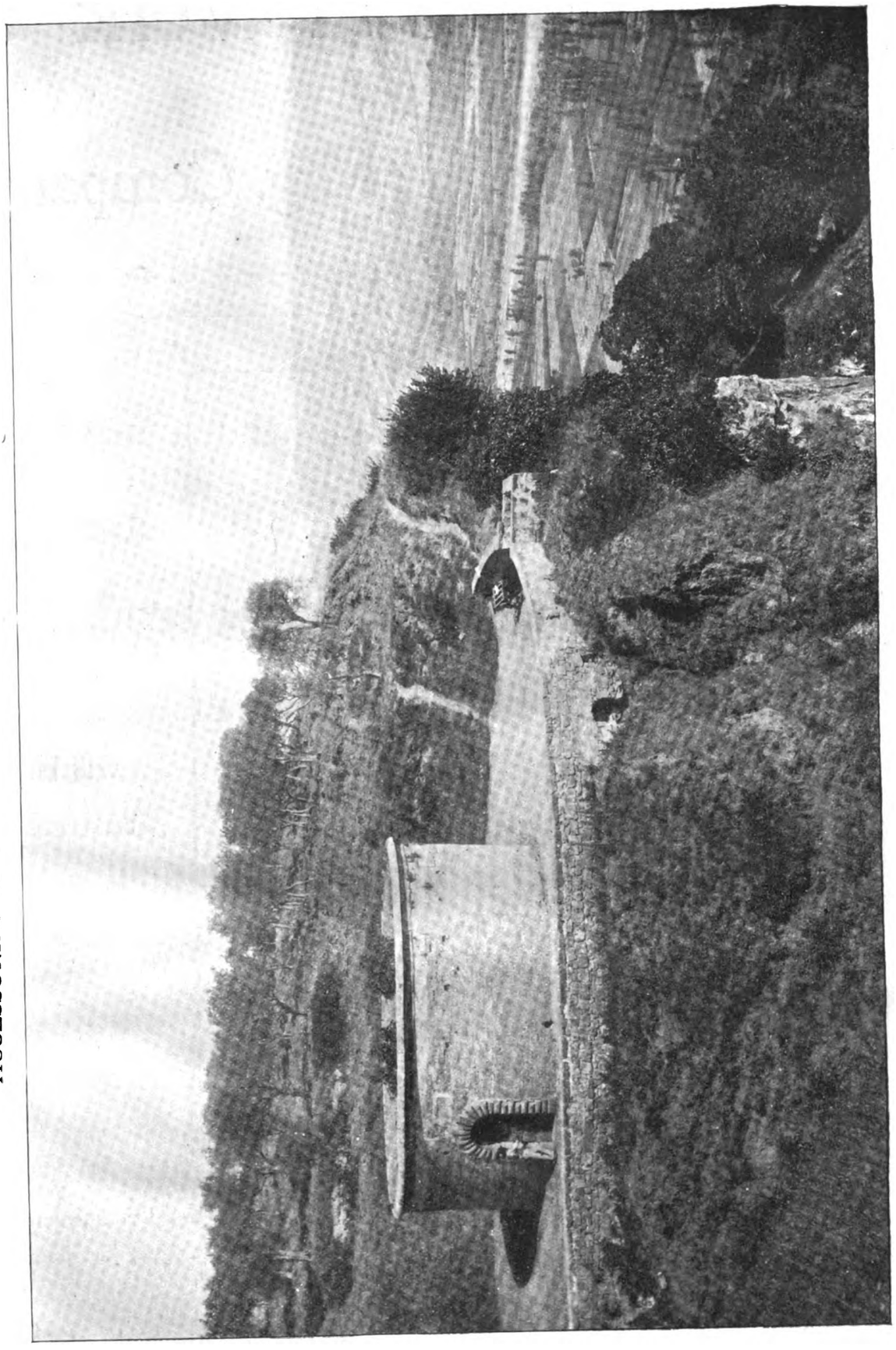
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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XXXIX.



THE WELL OF ST. PATRICK, ORVIETO, ITALY.
ANTONIO DE SANGALLO, ARCHITECT.

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The Art Metal Work

OF

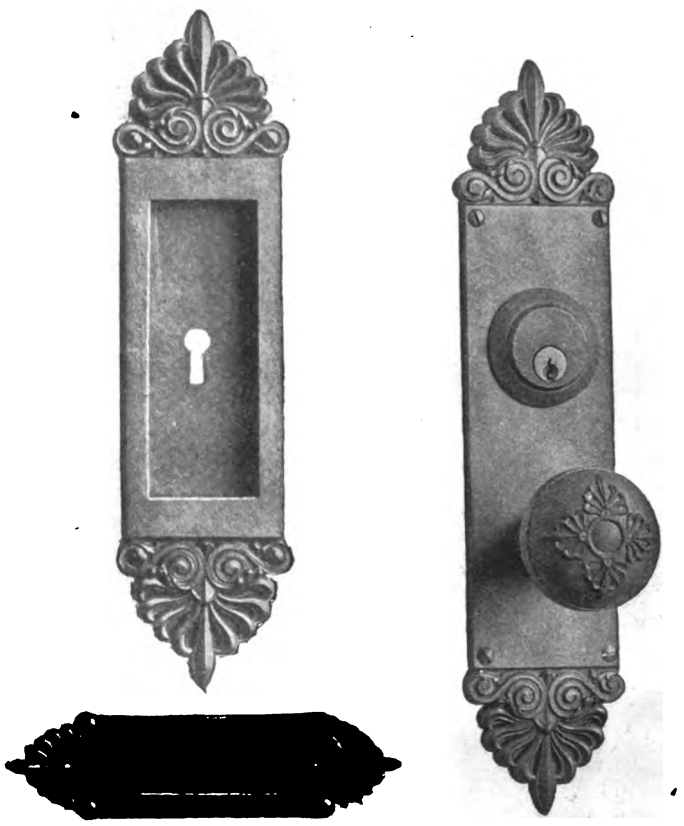
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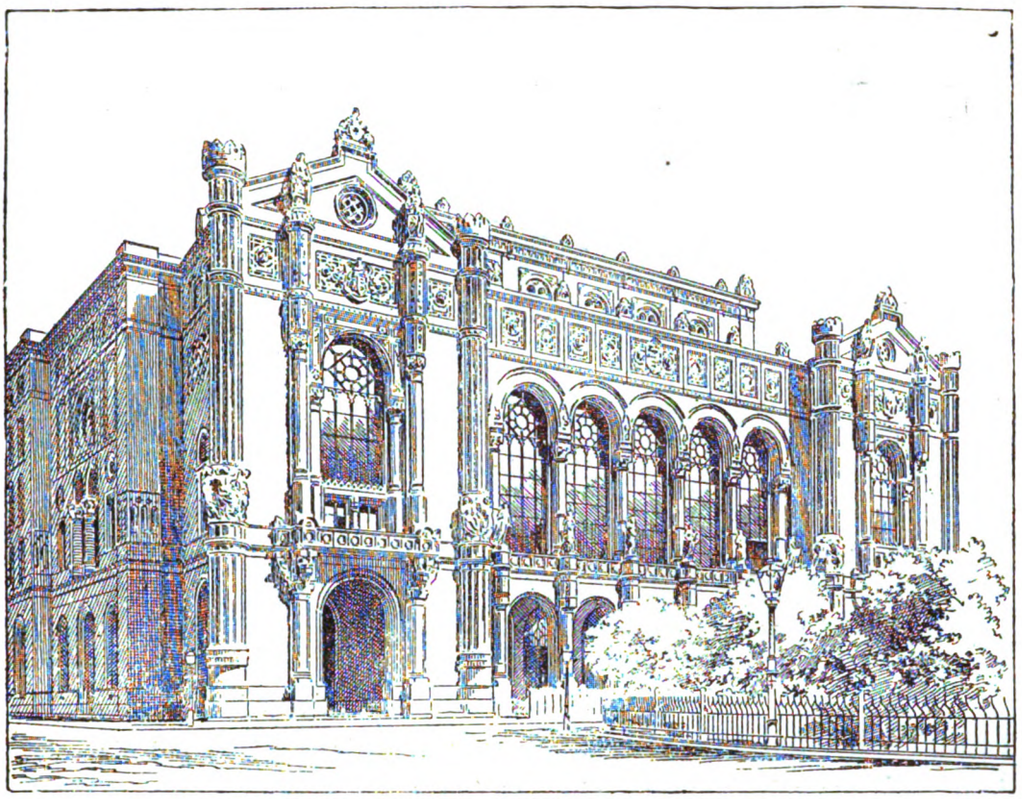
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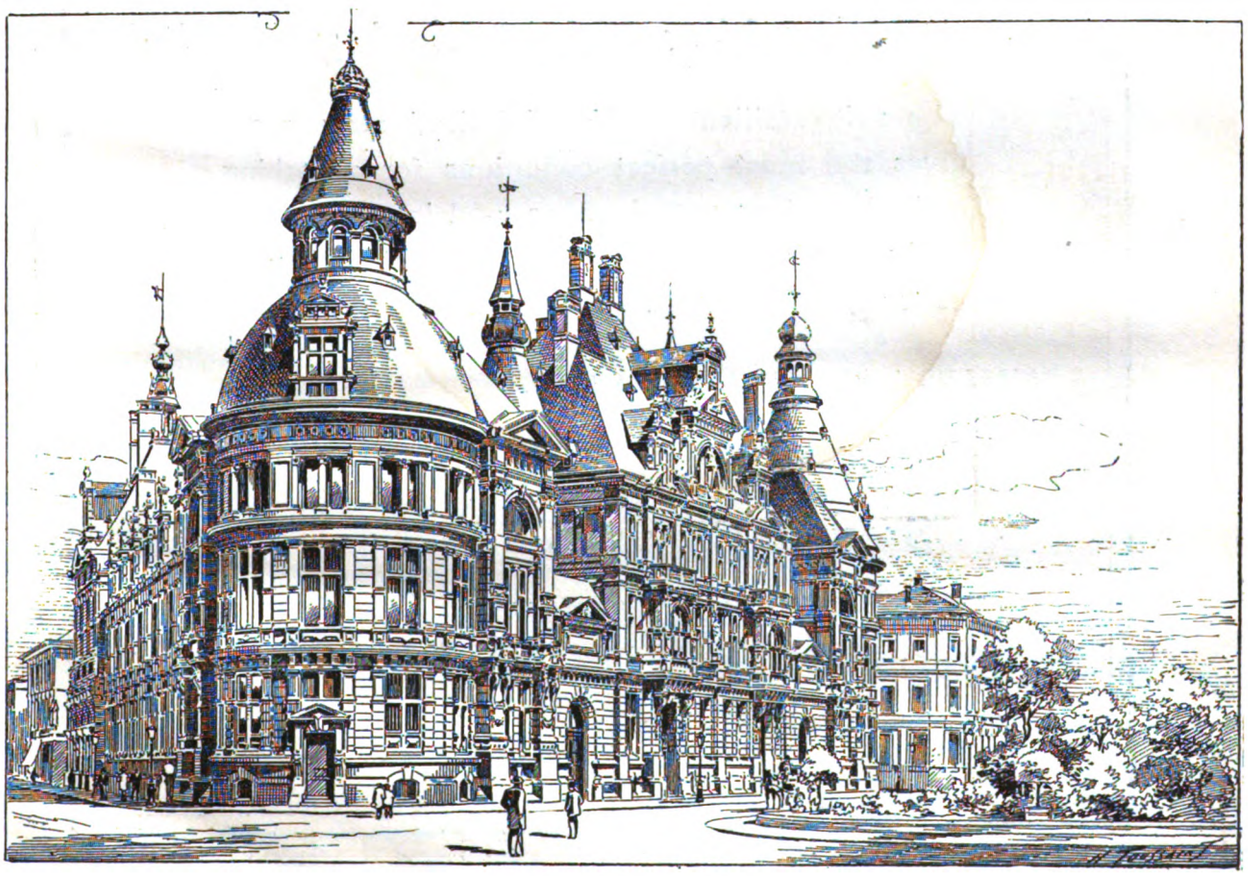
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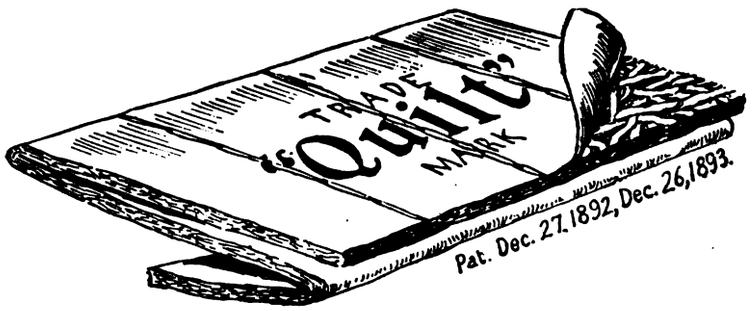


Redoute Building, Buda-Pesth, Hungary.



National Bank, Antwerp, Belgium.

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SAMPLES SENT ON APPLICATION.

SAMUEL CABOT, Sole Manufacturer,

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ACCESSORIES OF LANDSCAPE ARCHITECTURE. NO. XL.



BASIN OF THE CASCADE IN THE PARK AT FONTAINEBLEAU.

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POTSDAM RED SANDSTONE.

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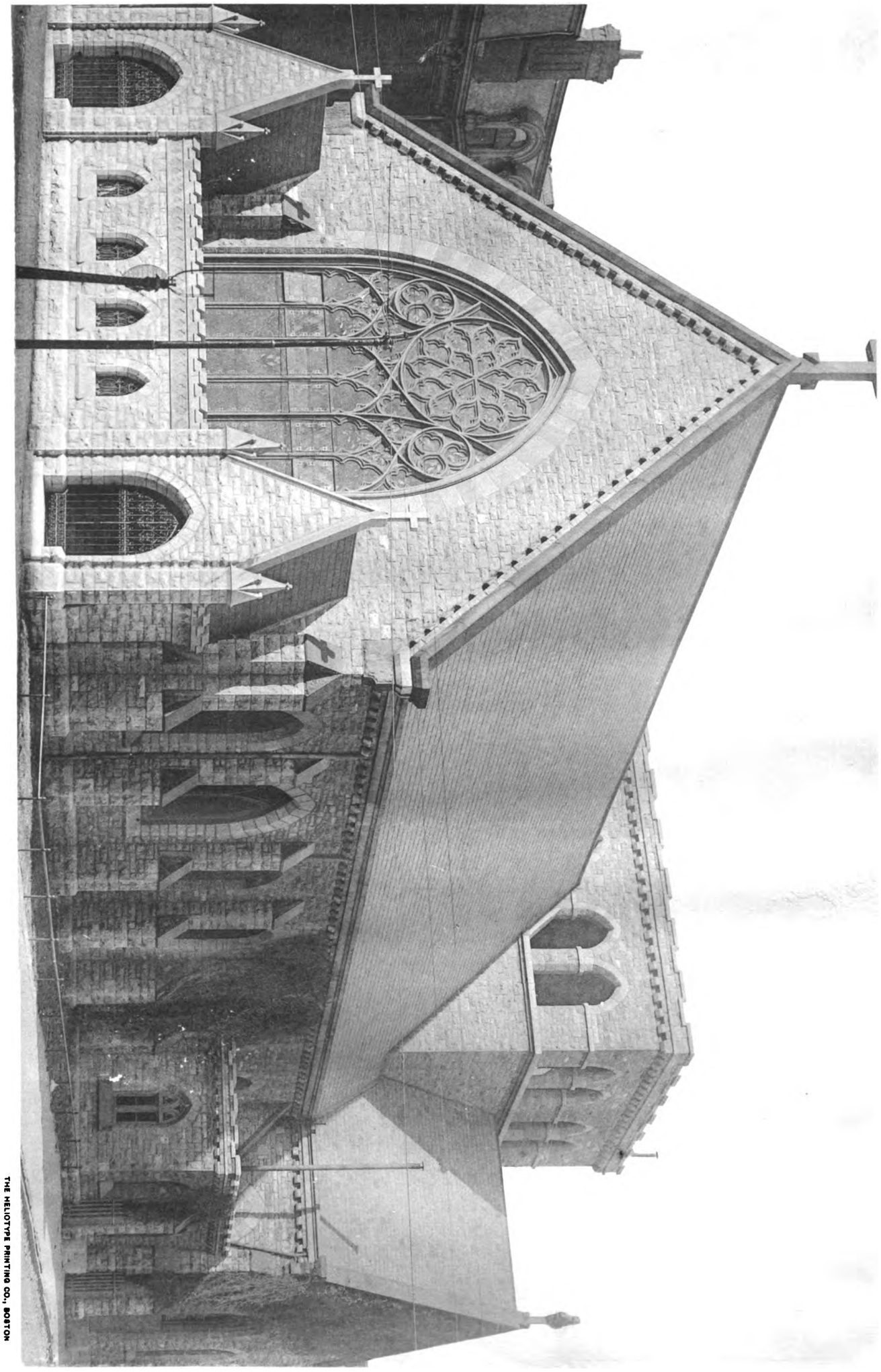
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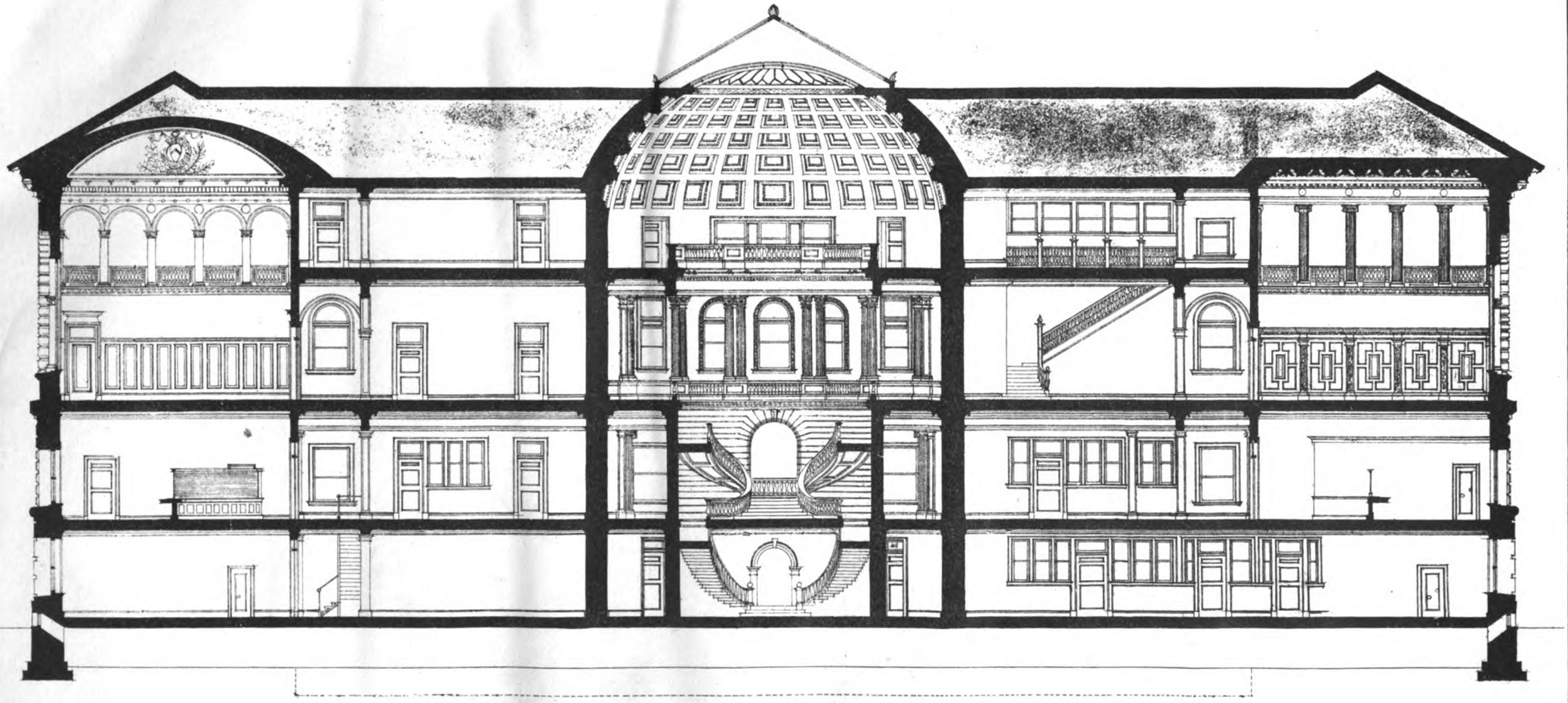
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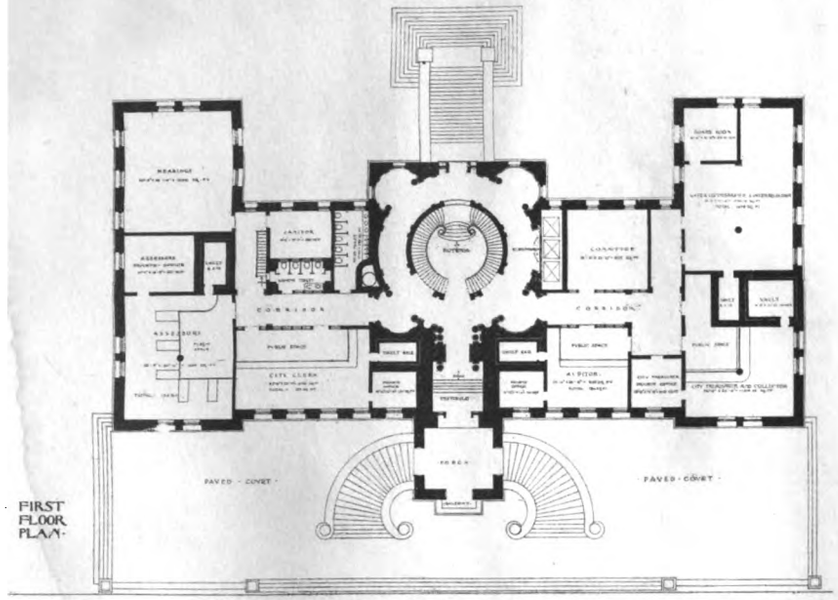
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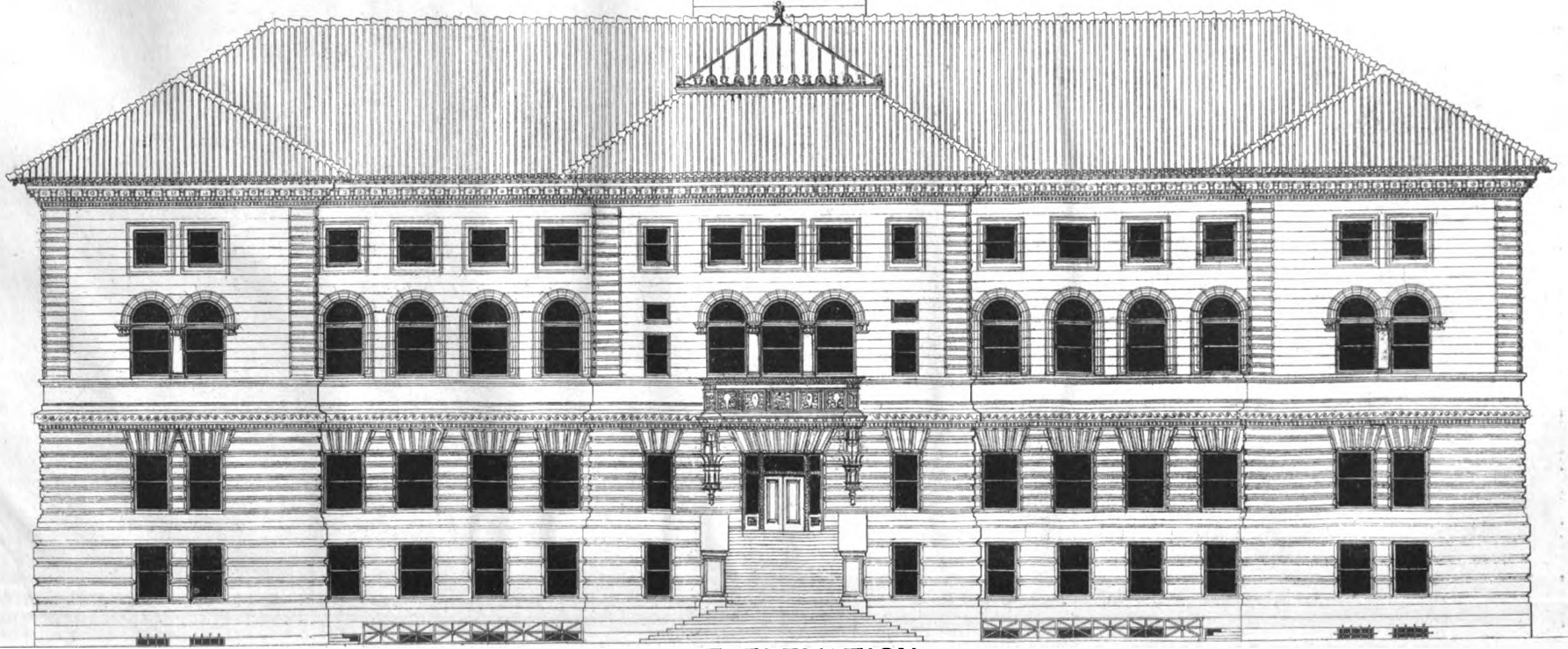
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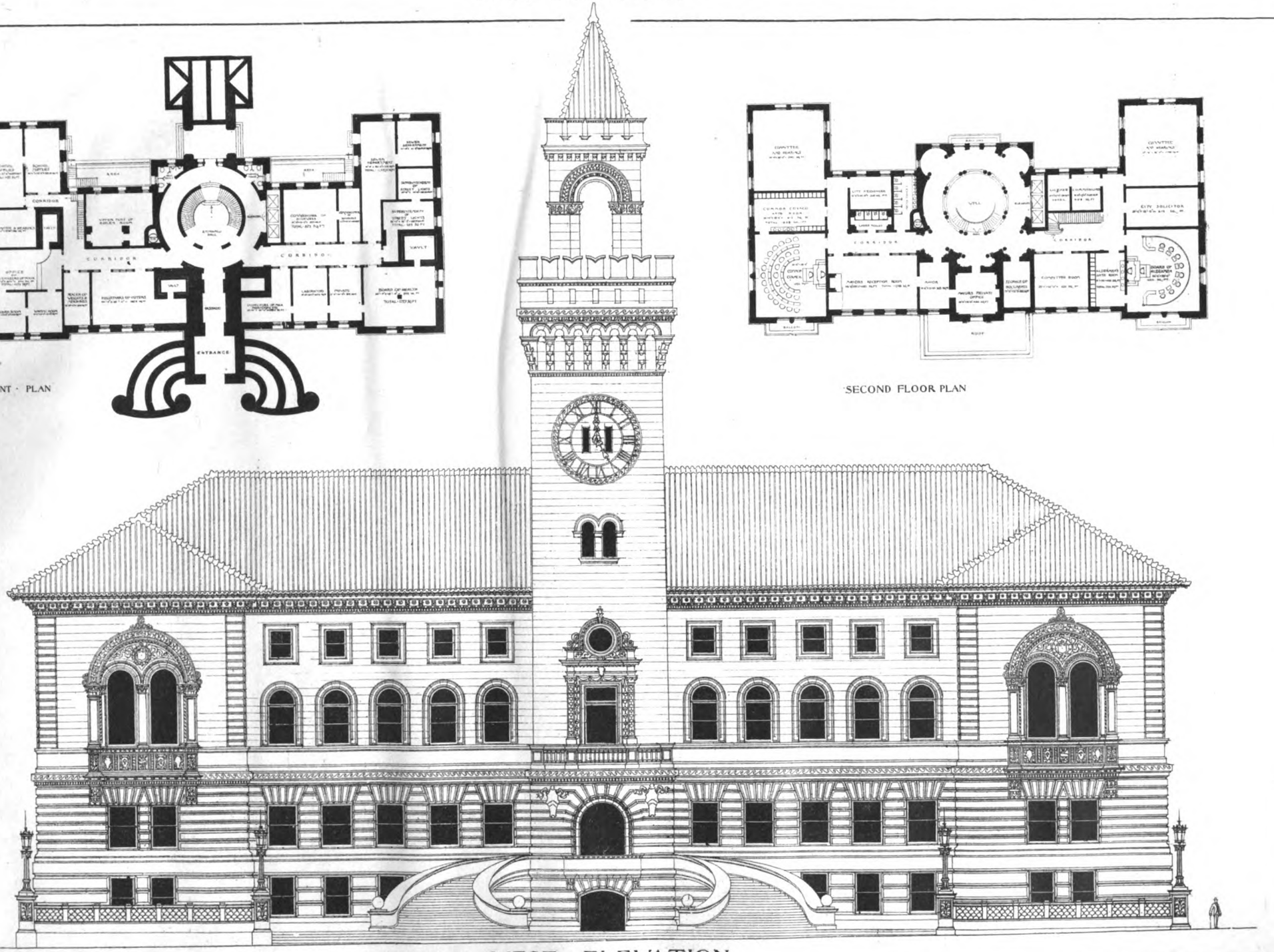
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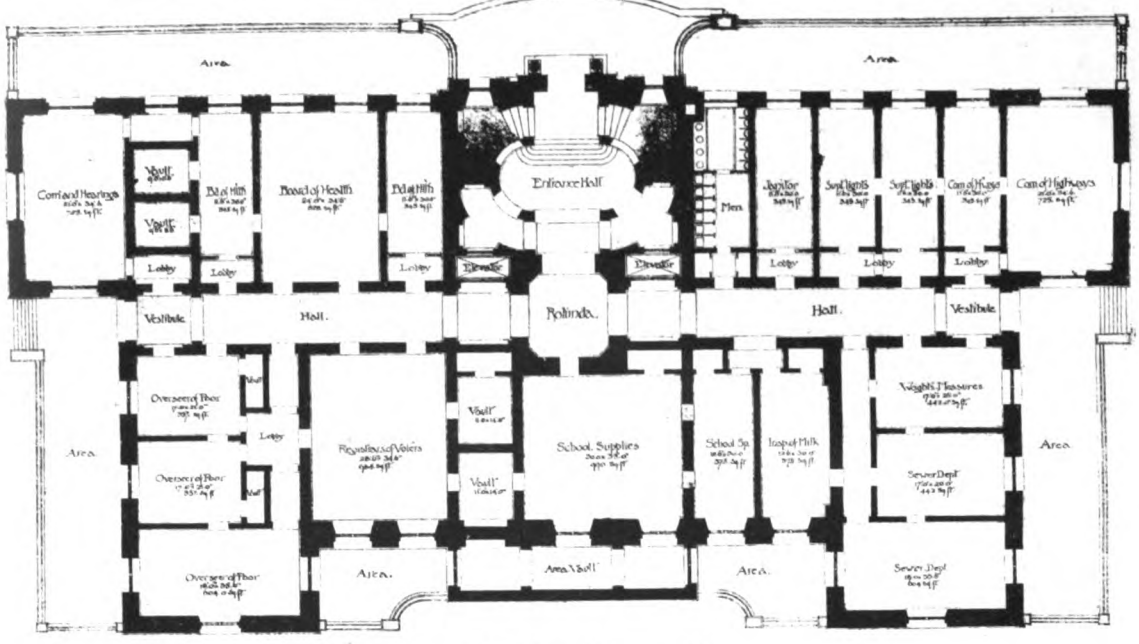
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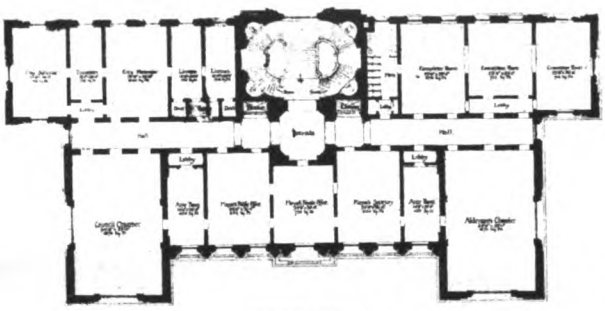
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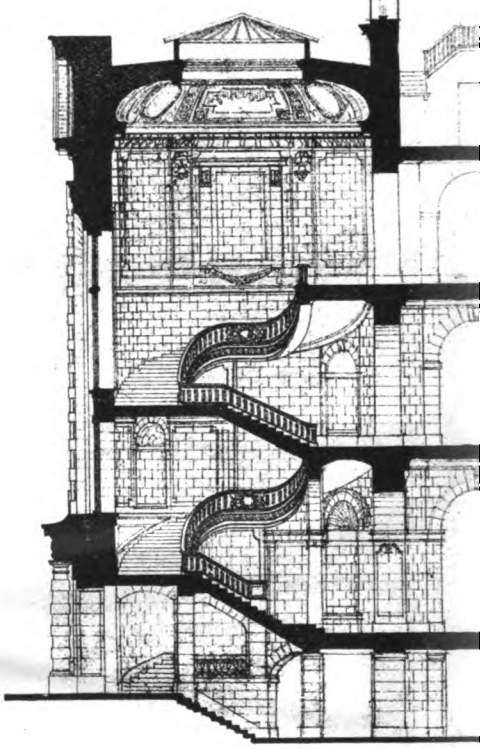
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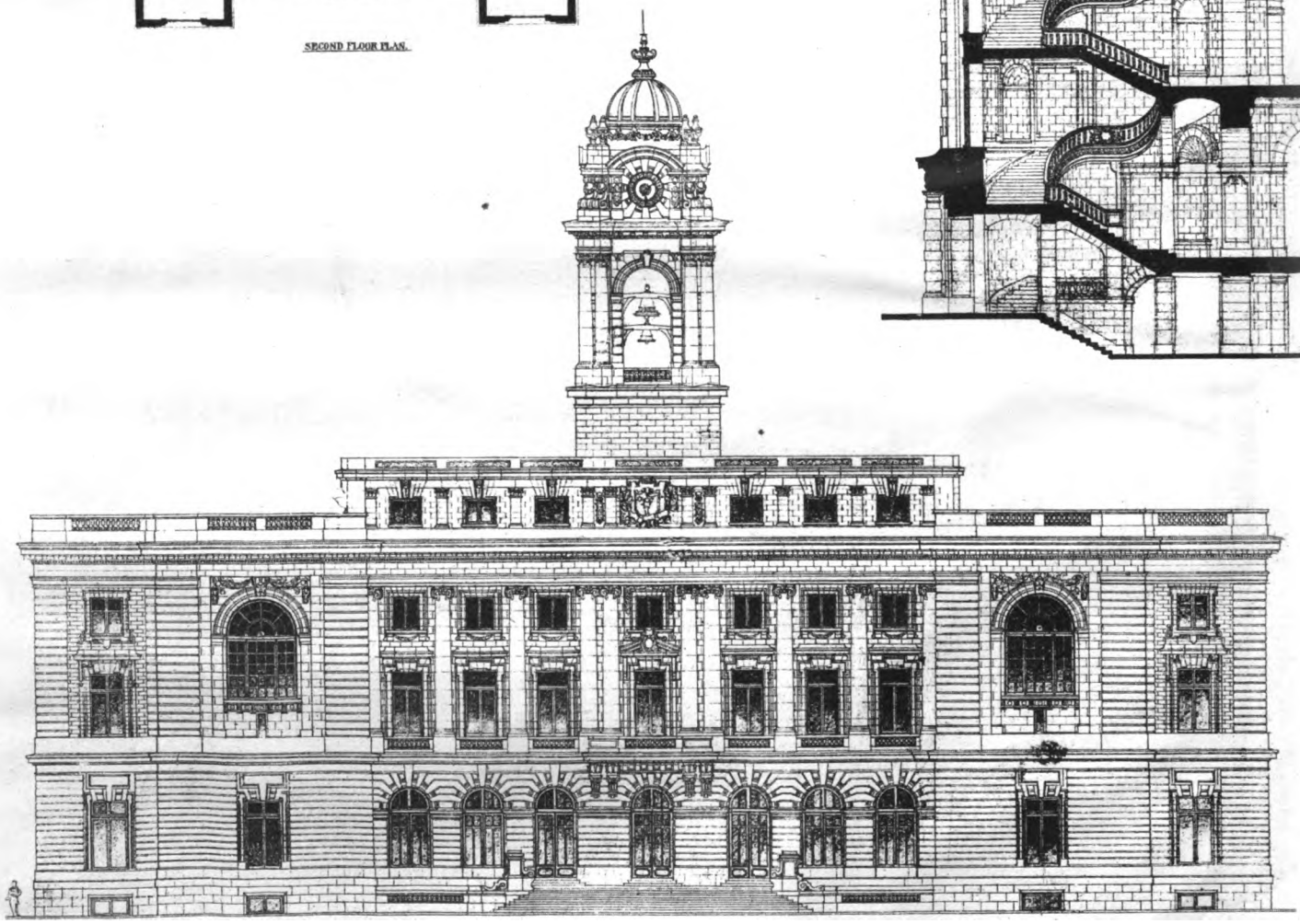


BASEMENT FLOOR PLAN.



SECOND FLOOR PLAN.





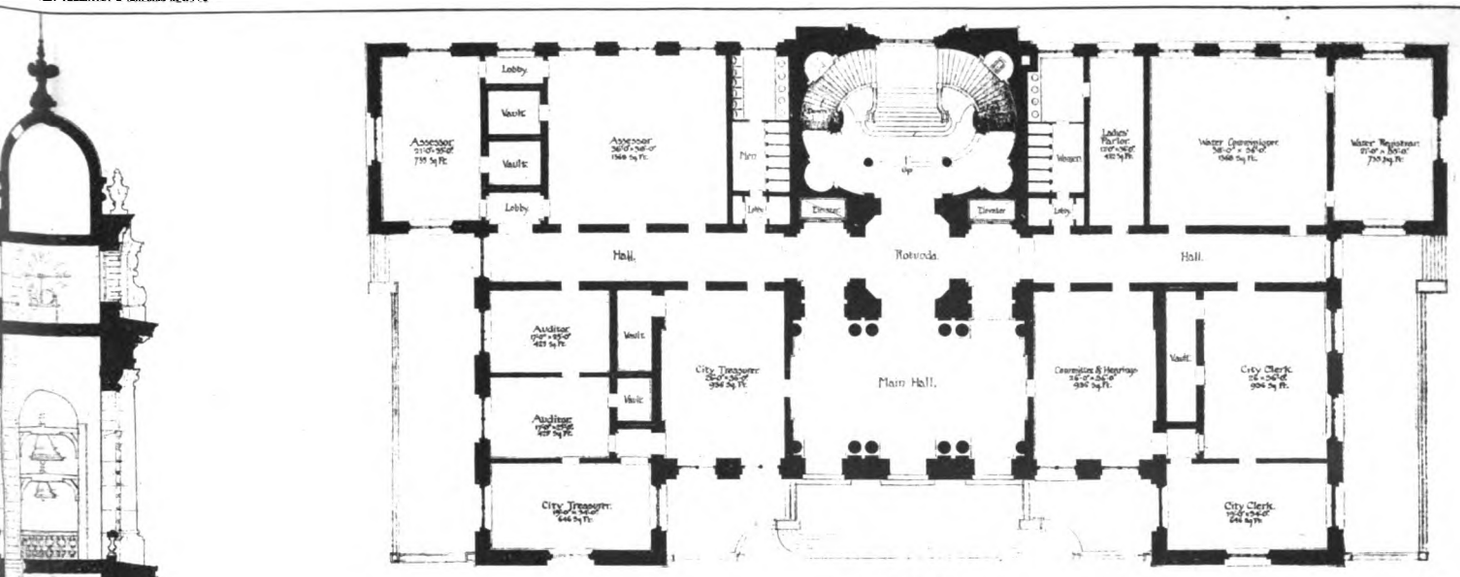
FRONT ELEVATION.

COMPETITIVE DESIGN FOR THE

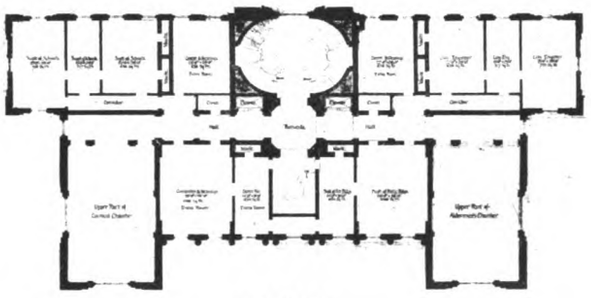
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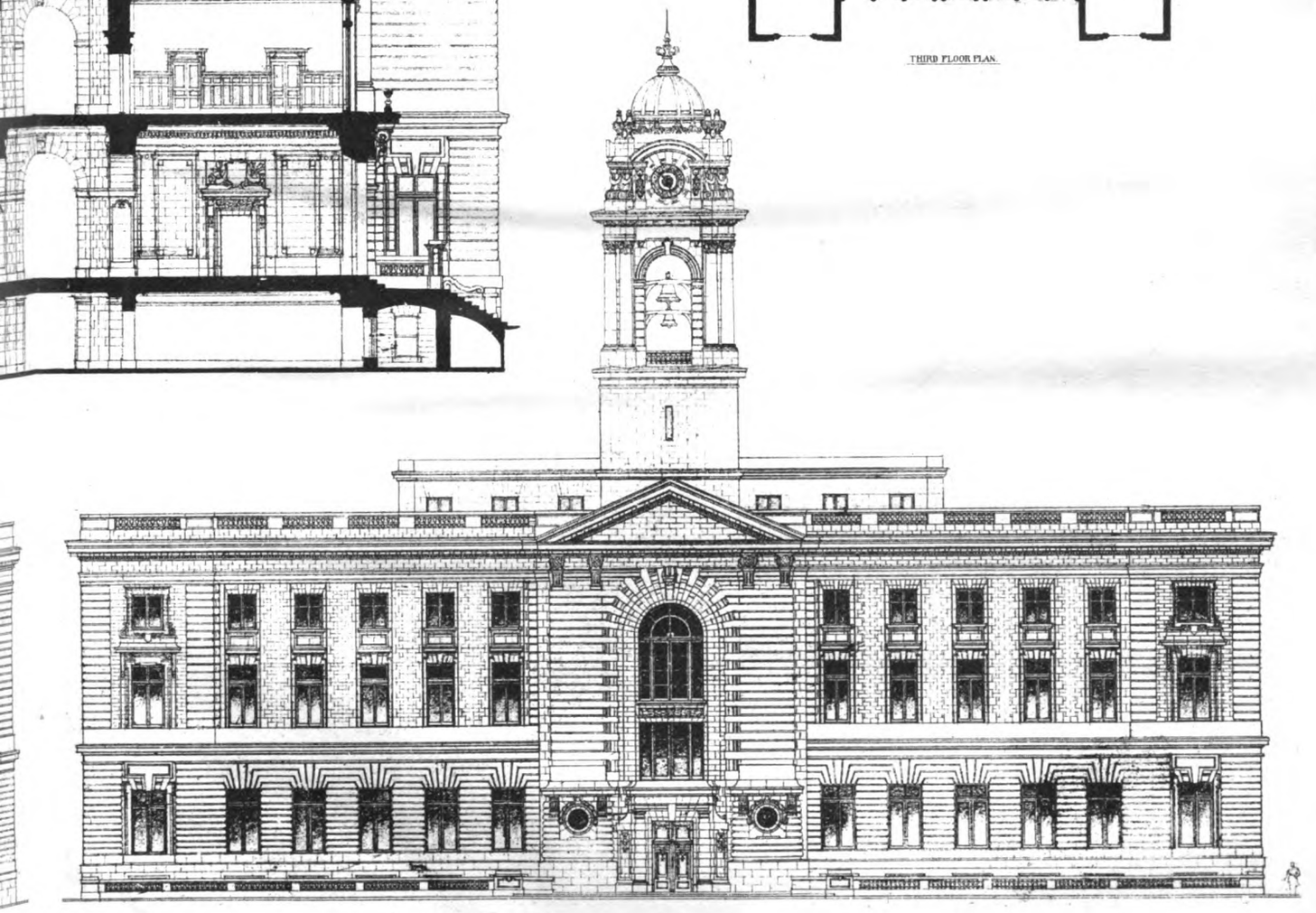
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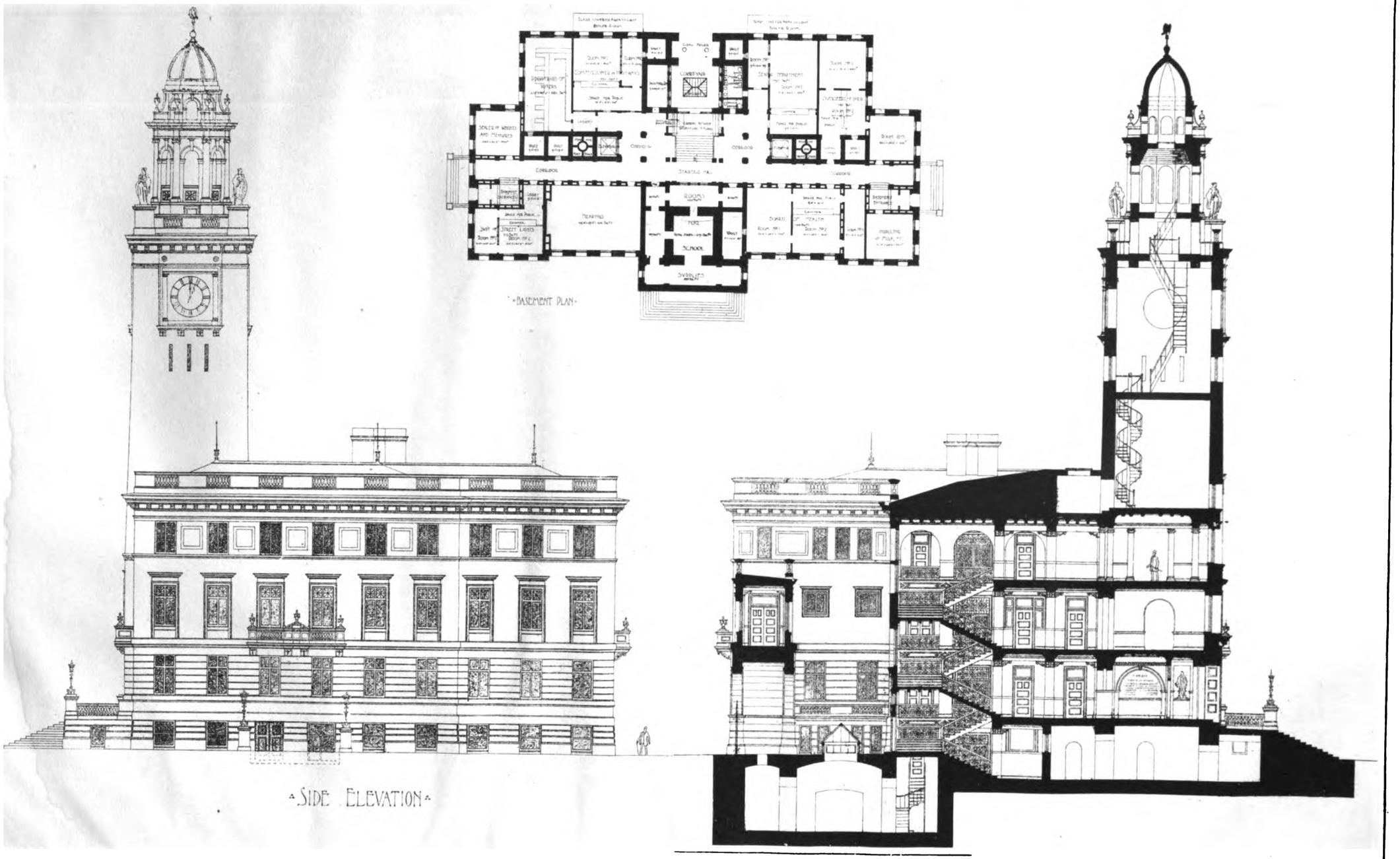
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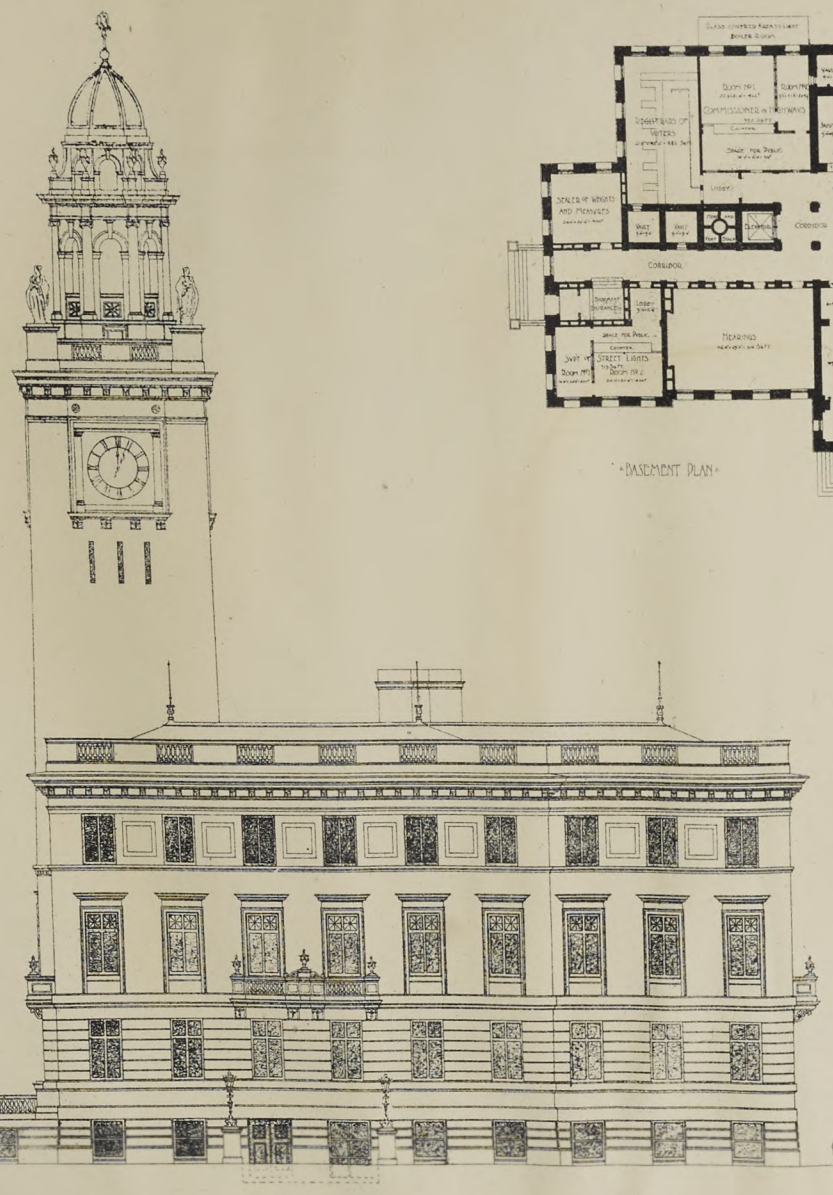
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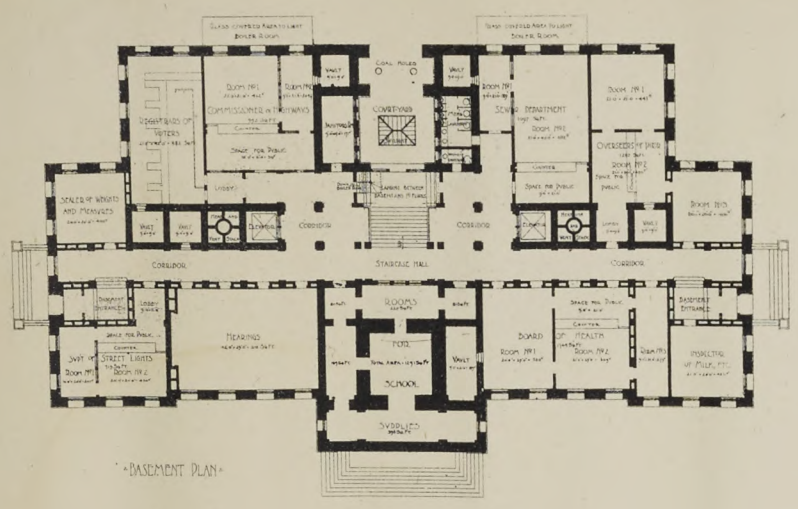


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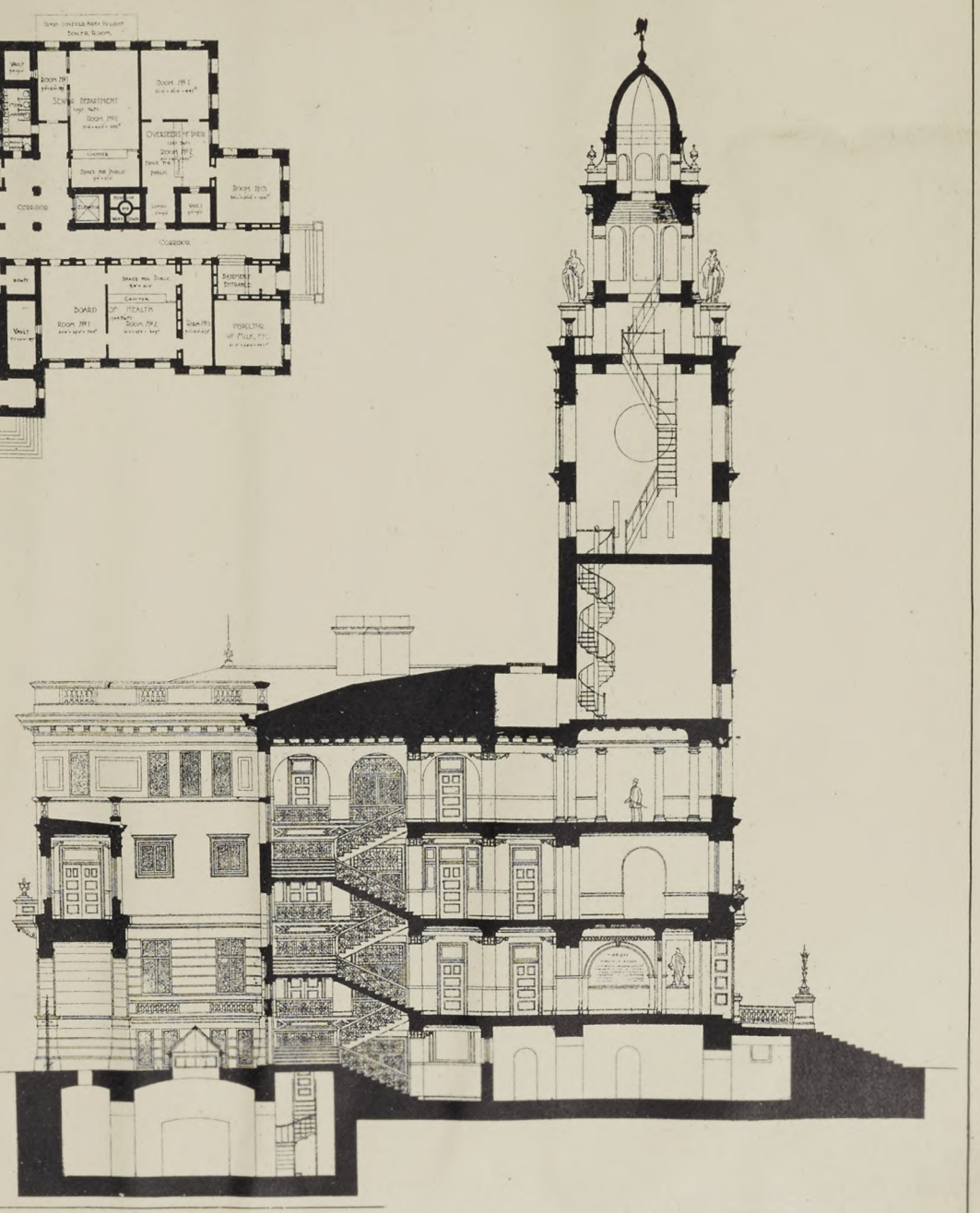
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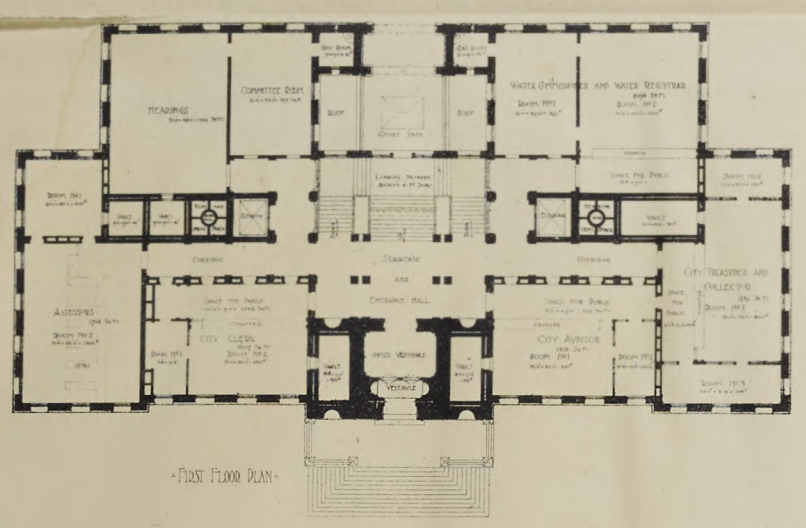


SIDE ELEVATION

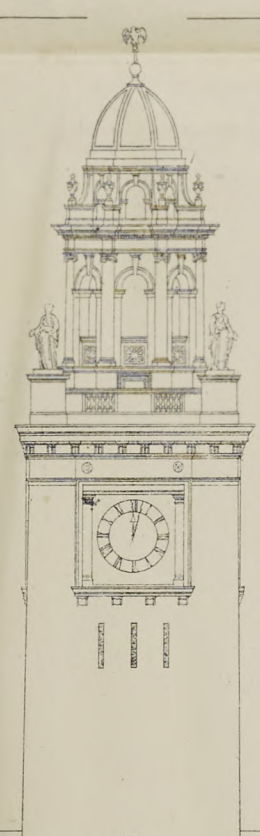


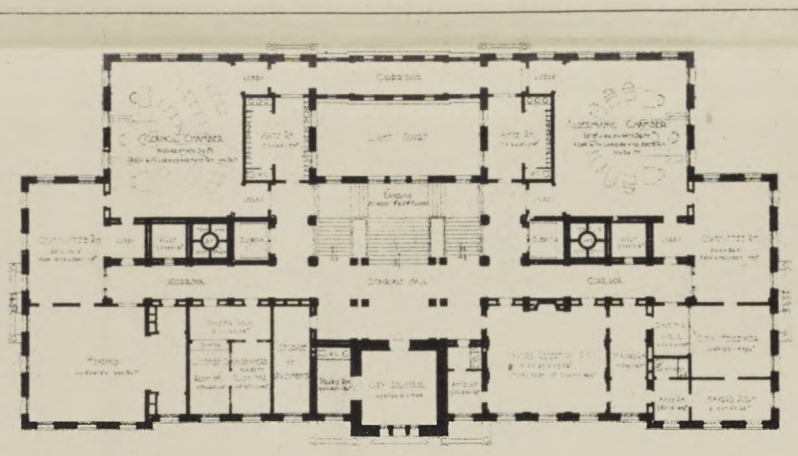
BASEMENT PLAN



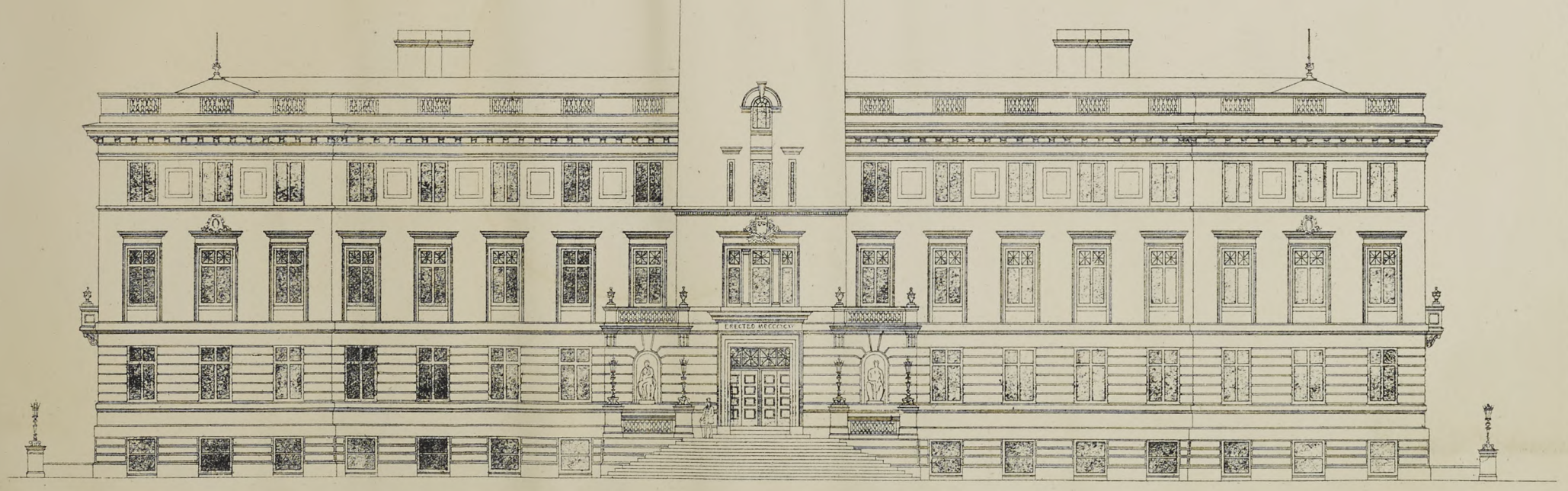


FIRST FLOOR PLAN





SECOND FLOOR PLAN



FRONT ELEVATION

COMPETITIVE DESIGN FOR THE CITY HALL, WORCESTER, MASS.

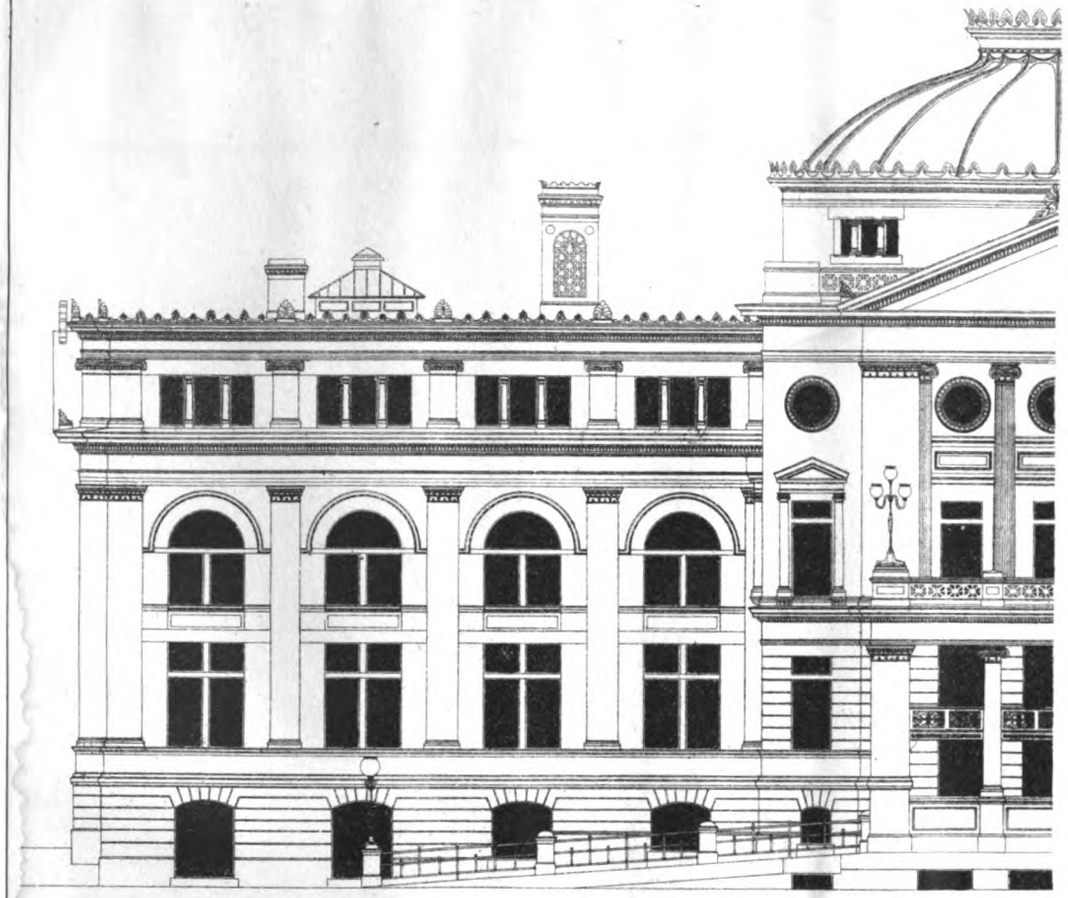
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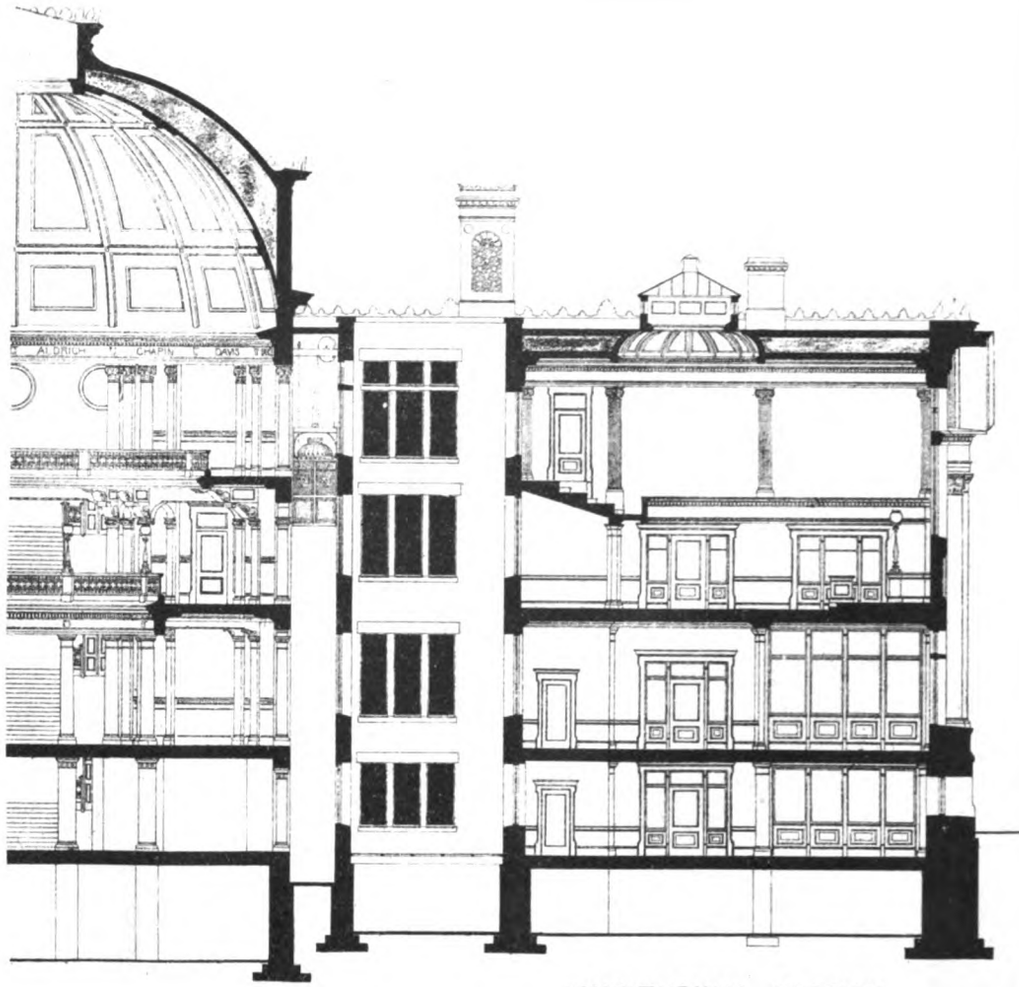
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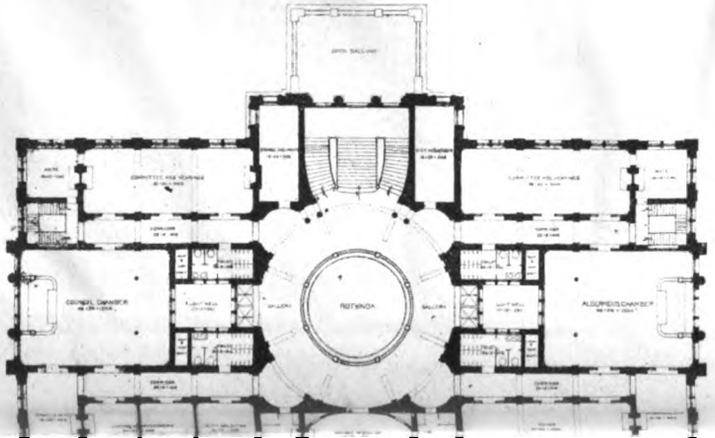
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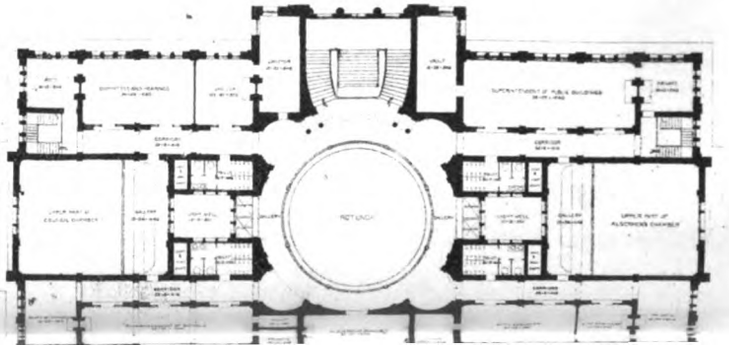


EAST ELEVATION

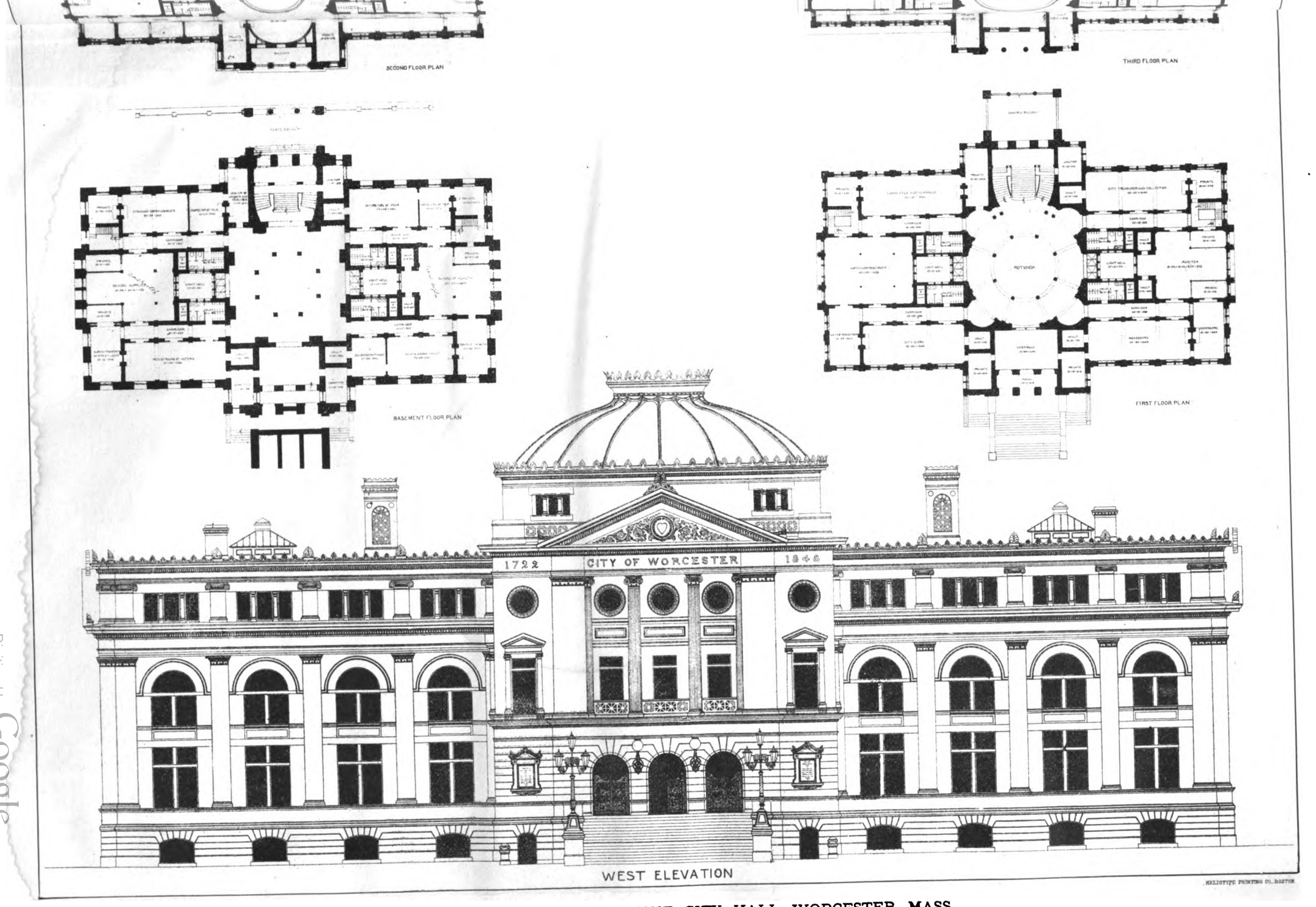


LONGITUDINAL SECTION





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A. P. CUTTING, ARCHITECT.

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INTERIOR OF CHARTRES CATHEDRAL.

After a Water-color by T. G. HOLYOKE

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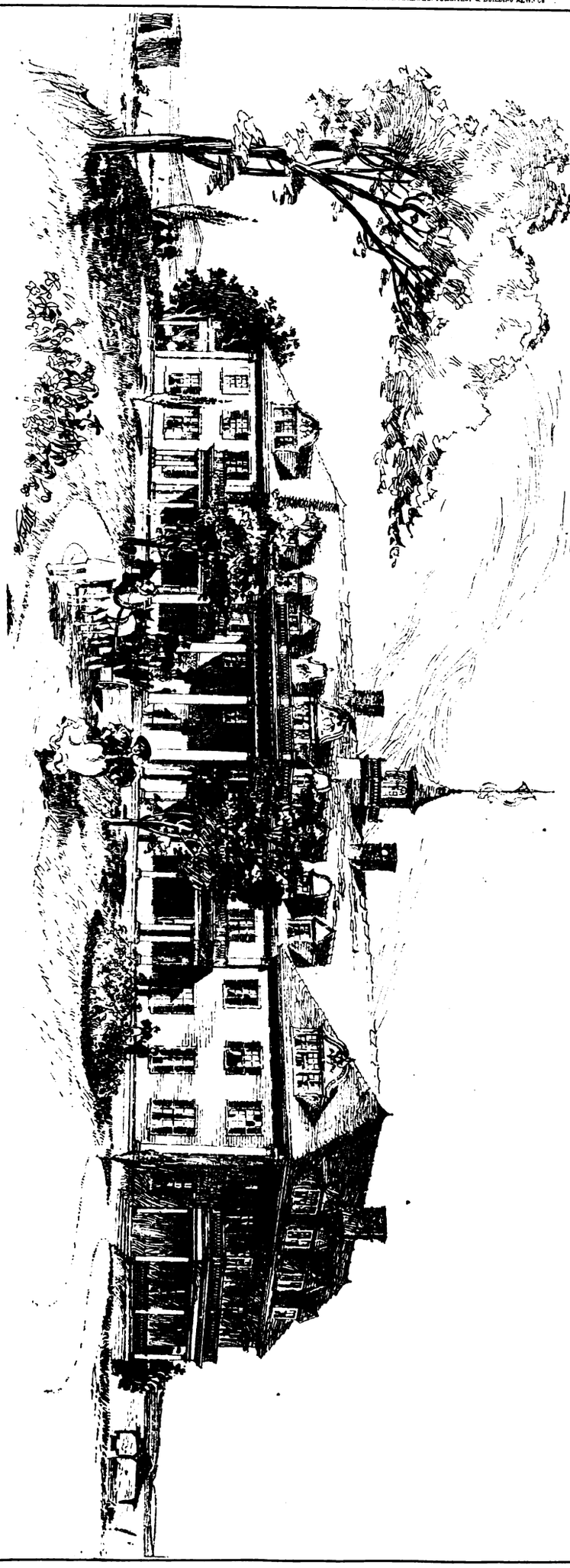
CITY OF BOSTON SHELTER AND DUCK HOUSE. BACK BAY FENS

EDWARD M. WHEELWRIGHT CITY ARCHITECT

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HOUSE IN ST. THOMAS'S CHURCHYARD, SALISBURY, ENG.

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ADLER & SULLIVAN, Architects.

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~Female Asylum, Tewksbury Mass~

John A Fox Architect Boston

South West View

First Floor Plan

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SCALE OF FEET

0 5 10 20 25 30 35 40

CITY HALL
AT
NEW ORLEANS LA.
ERECTED IN 1850
J. GALLIER ARCHT.

[ORIGINAL DRAWINGS LOST]

MEASURED AND DRAWN
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A. ALLISON JR. F.G. CHURCHILL
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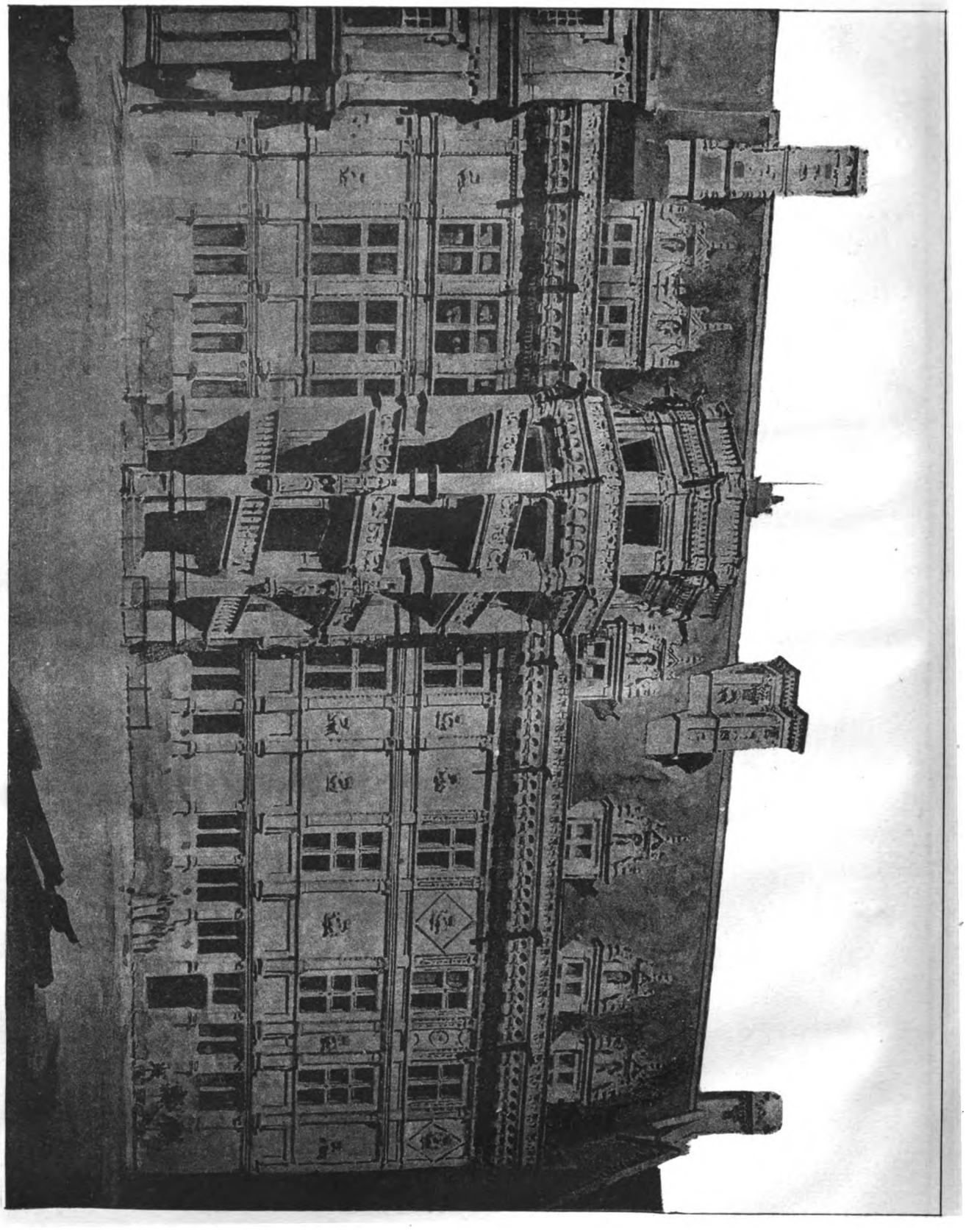
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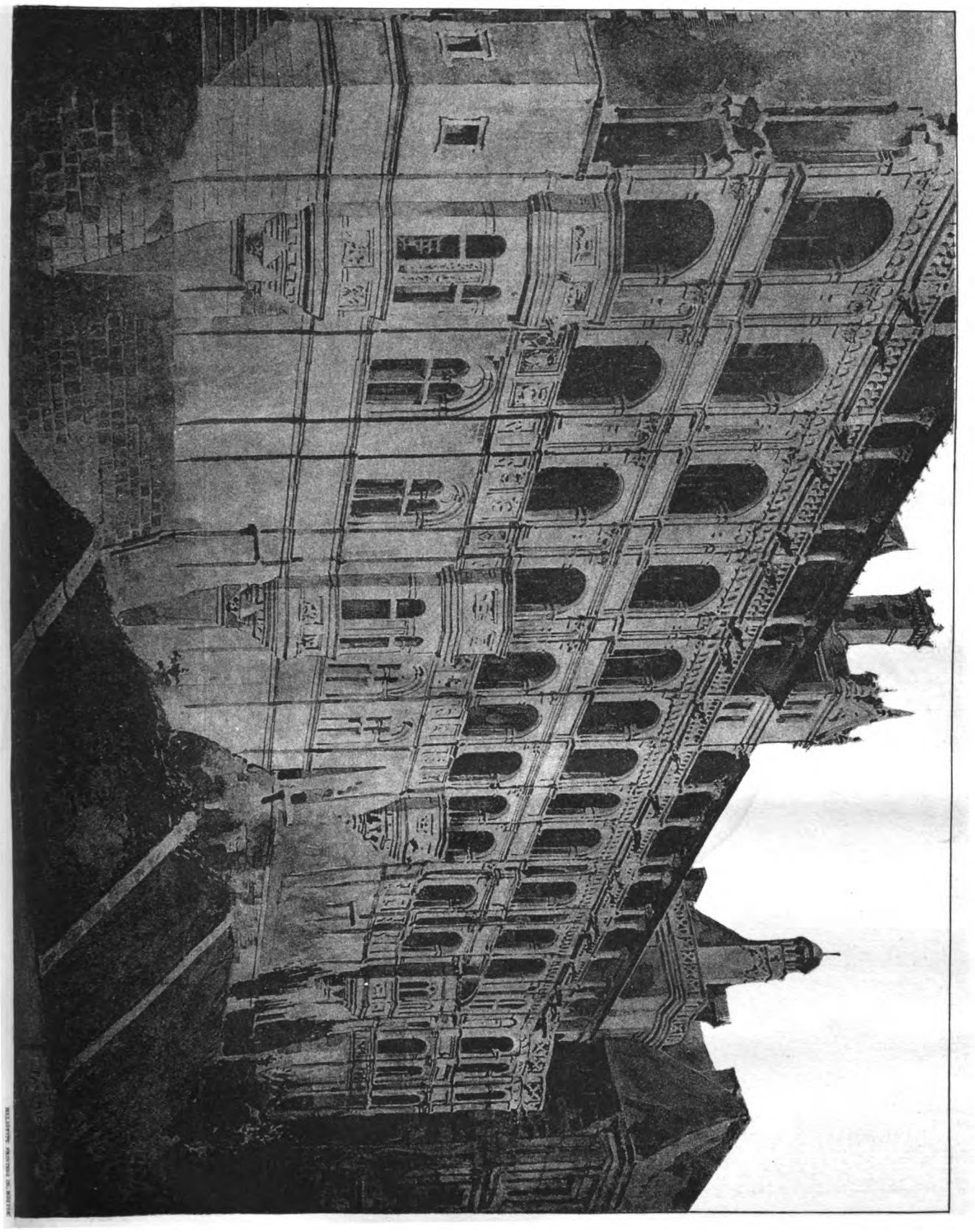


CHATEAU DE BLOIS.

THE COURT FACADE, WING OF FRANCIS I

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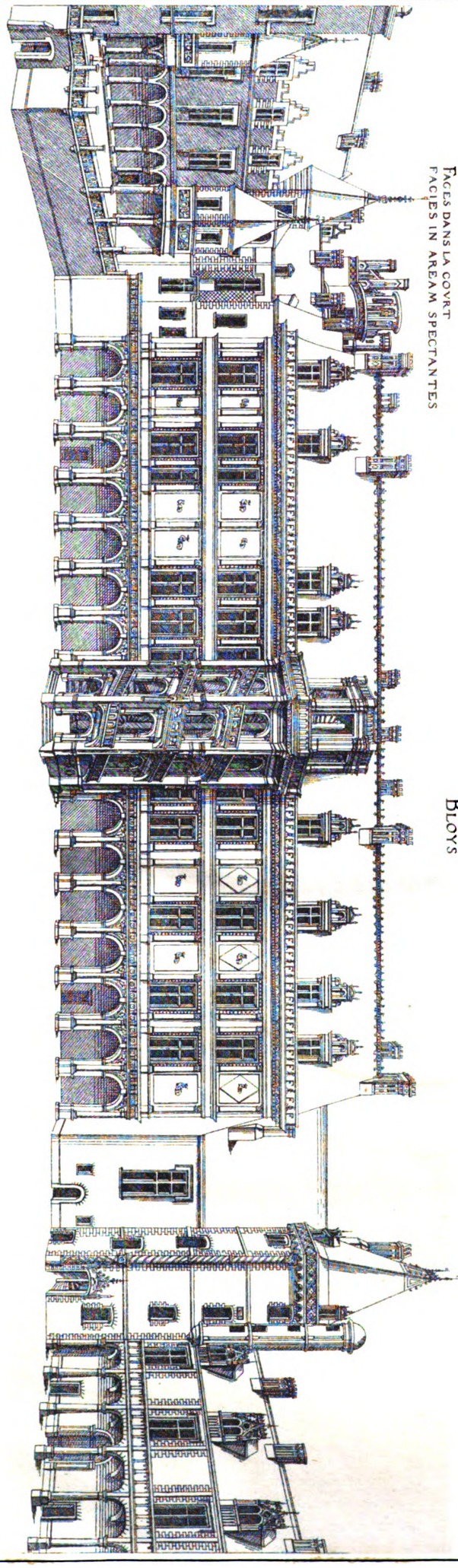
CHATEAU DE BLOIS.

NORTH FACADE, WING OF FRANÇOIS I.

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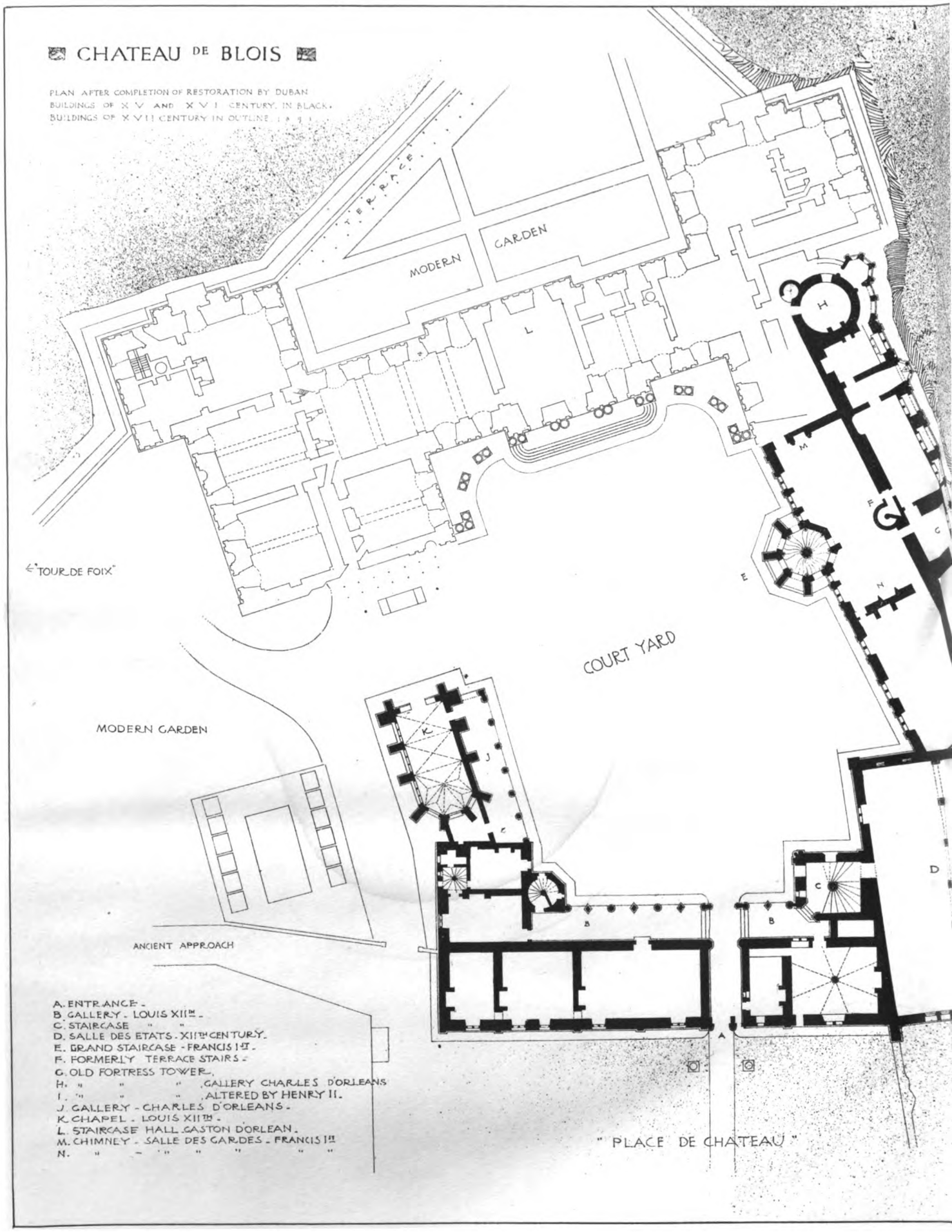
FAÇES DANS LA COVRT
FACIES IN AREAM SPECTANTES

BLOYS

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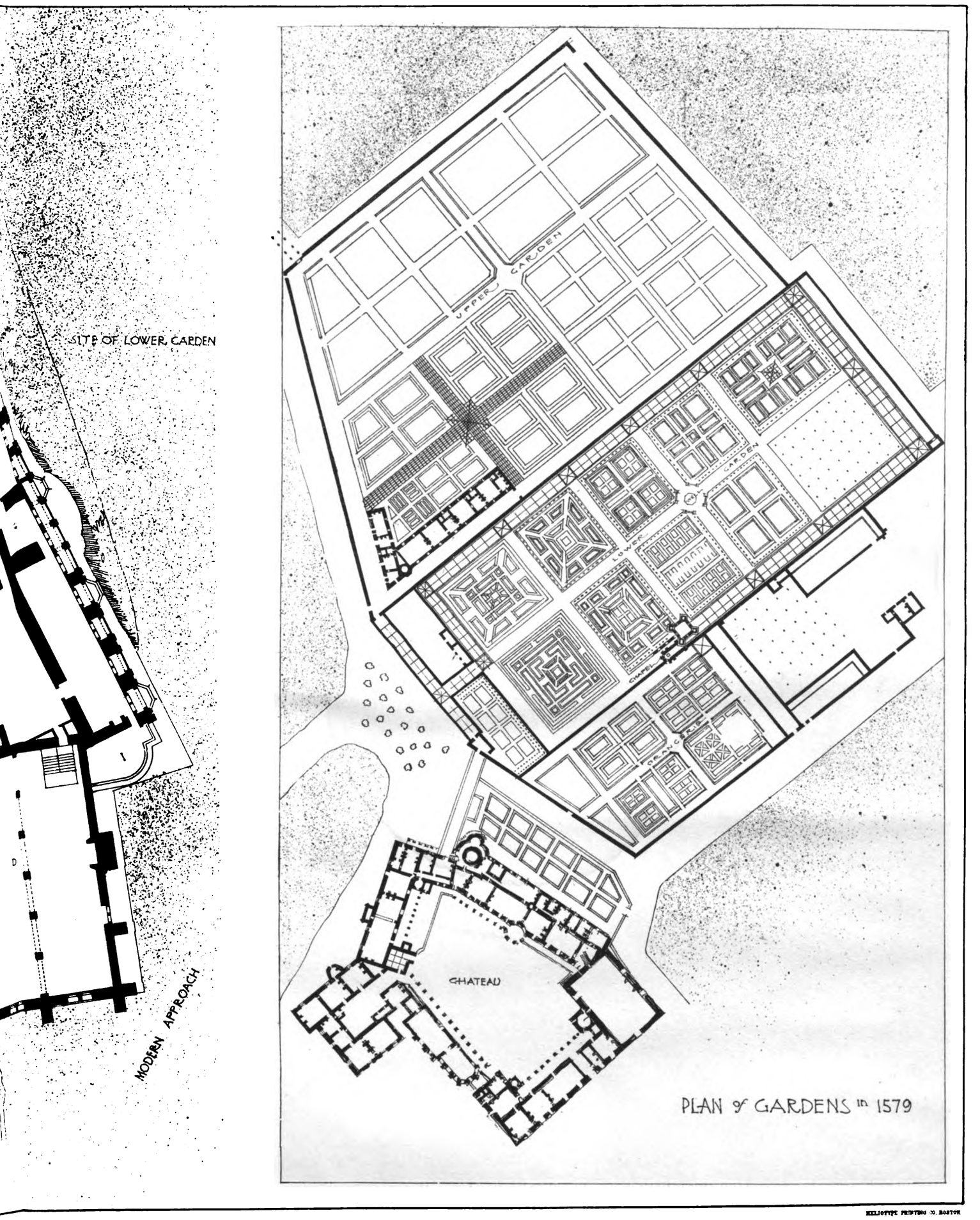
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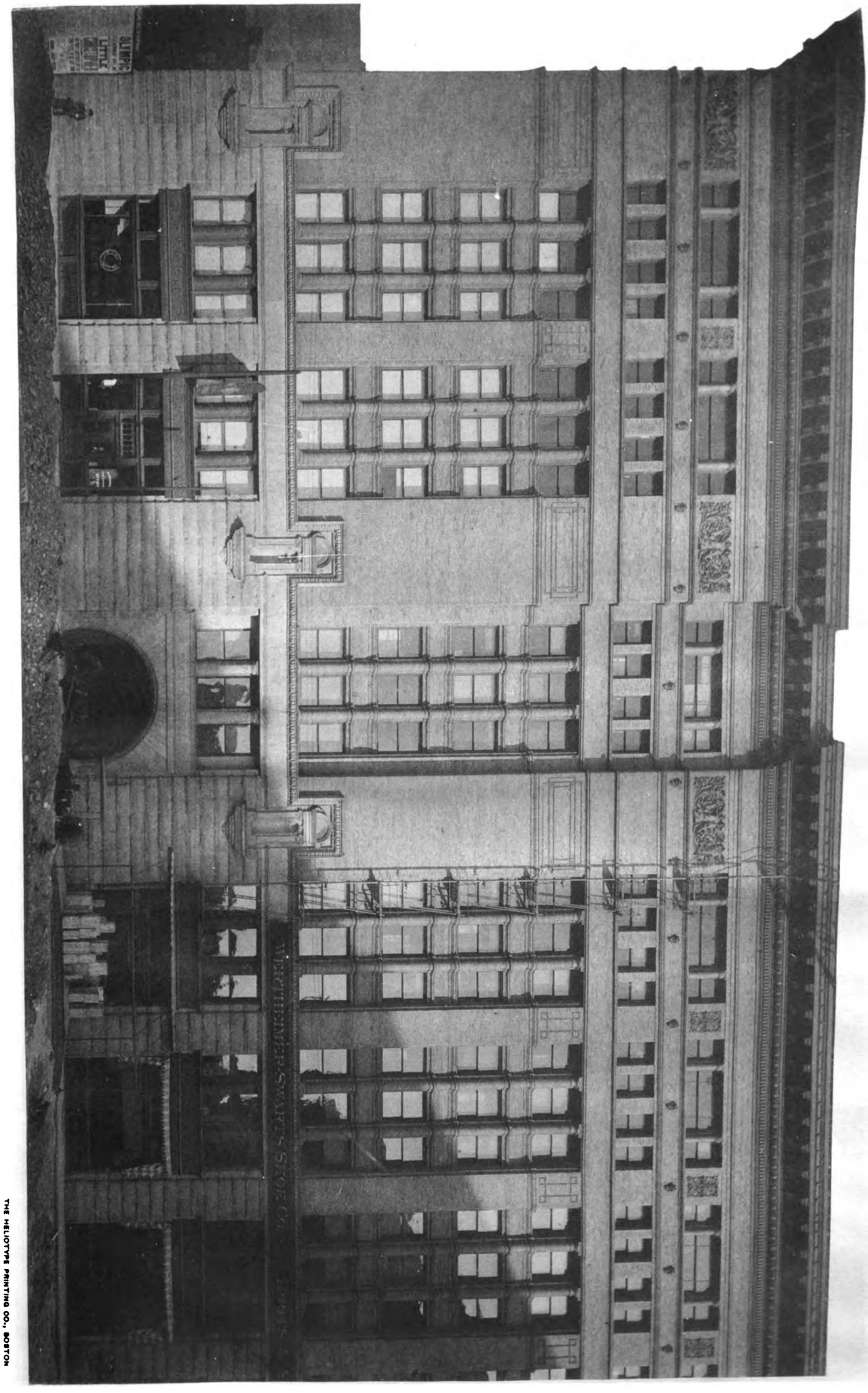


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G. R. MANN, Architect.

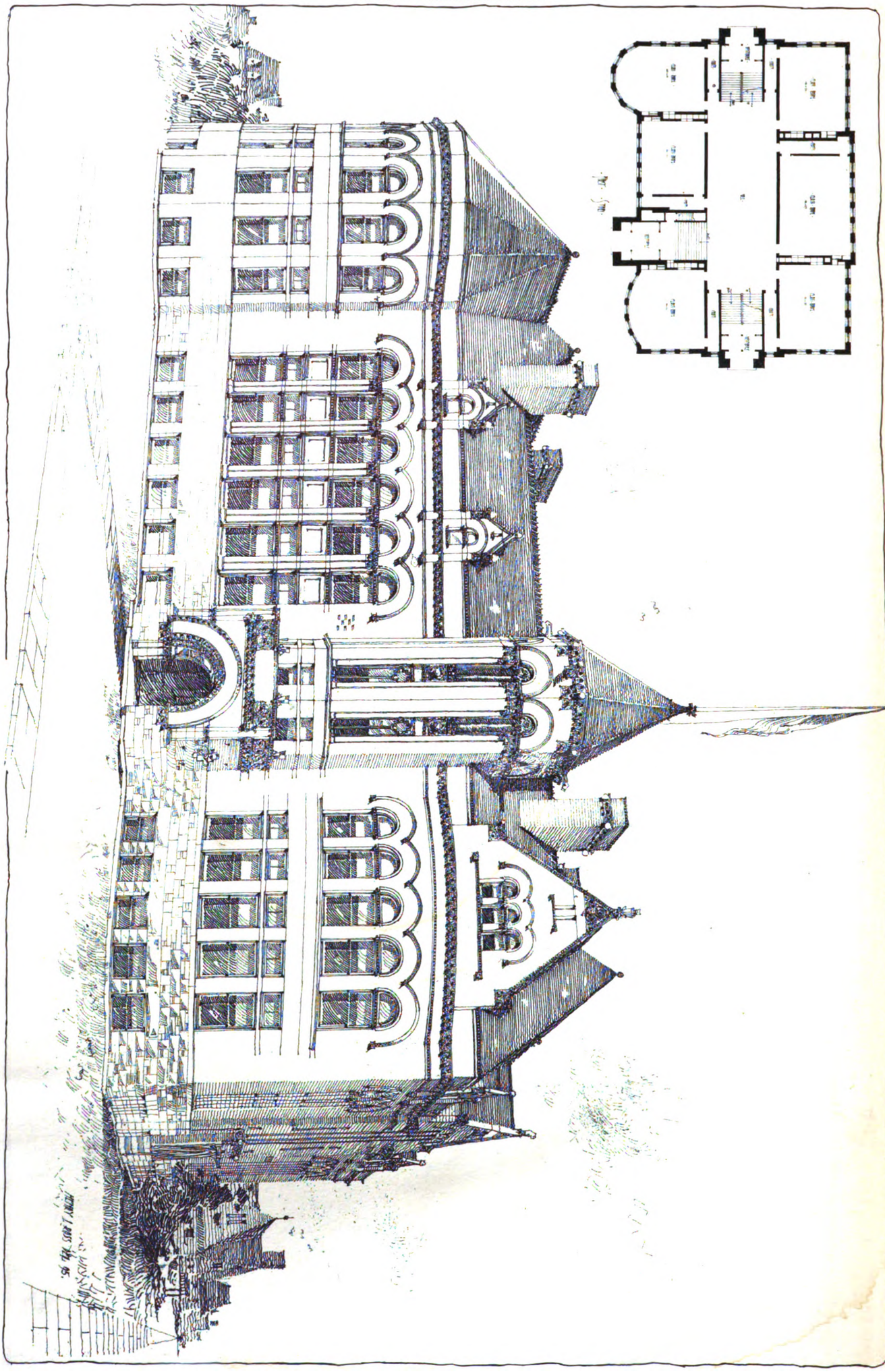
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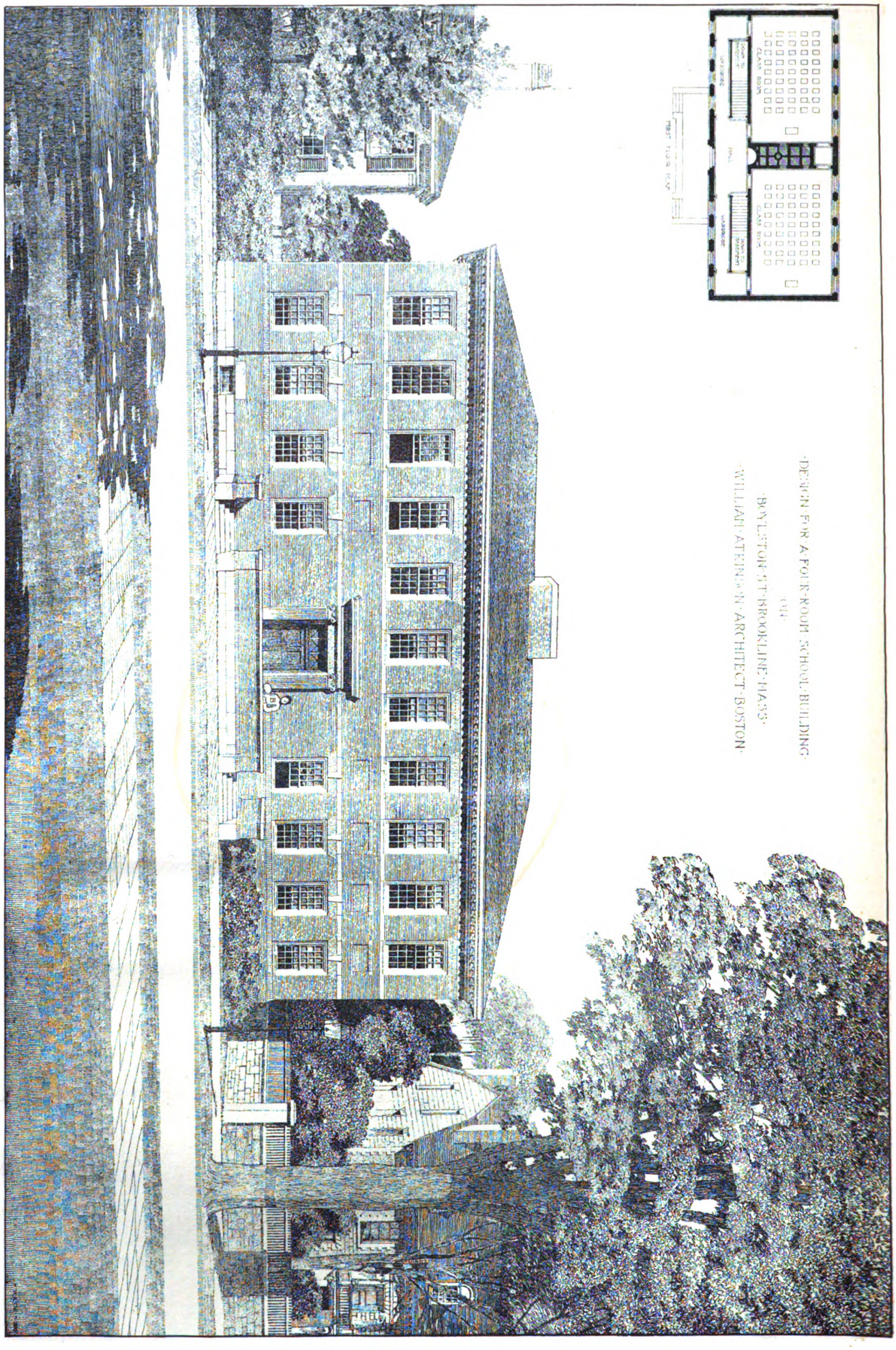
LINCOLN SCHOOL, EVANSTON, ILL.

J. T. W. JENNINGS and HENRY J. ROSS, Architects, Chicago, Ill.

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DESIGN FOR A FOUR-ROOM SCHOOL BUILDING.

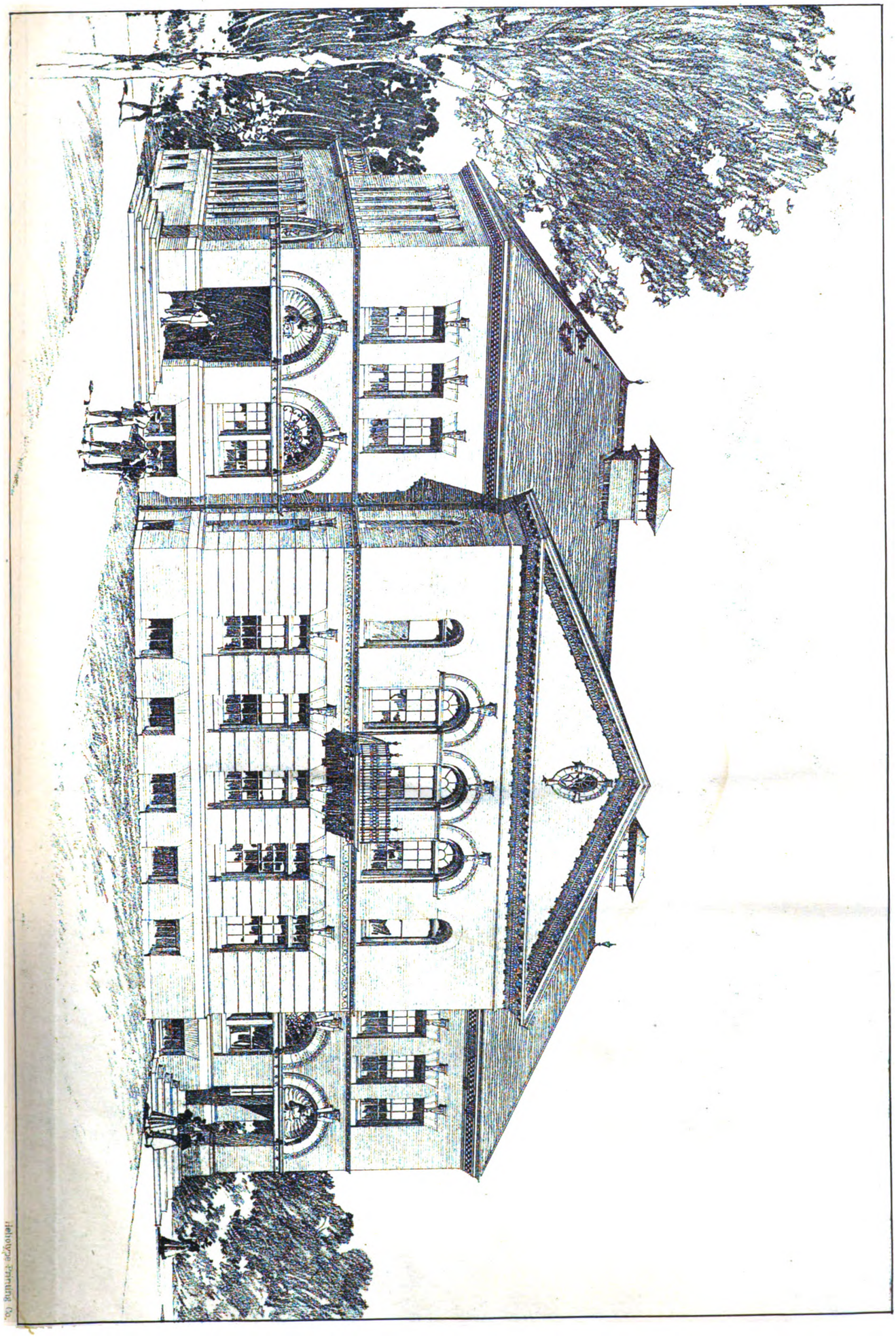
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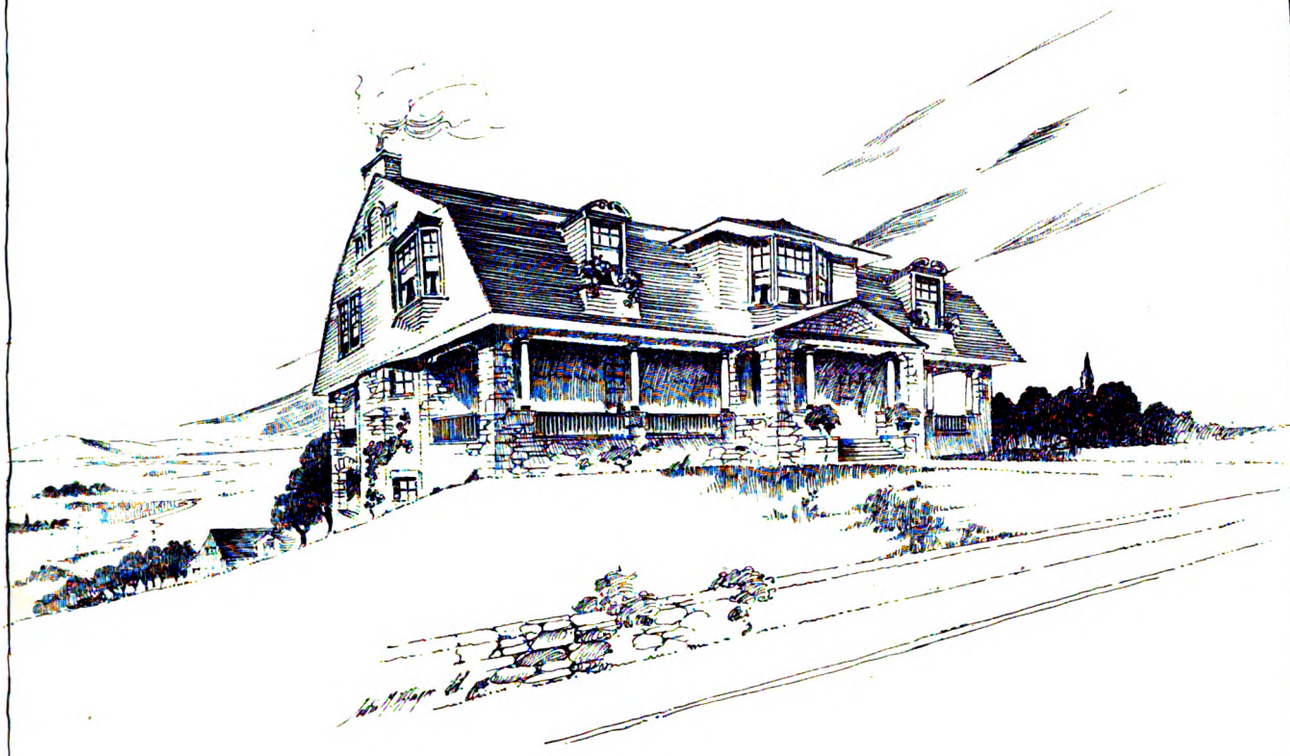
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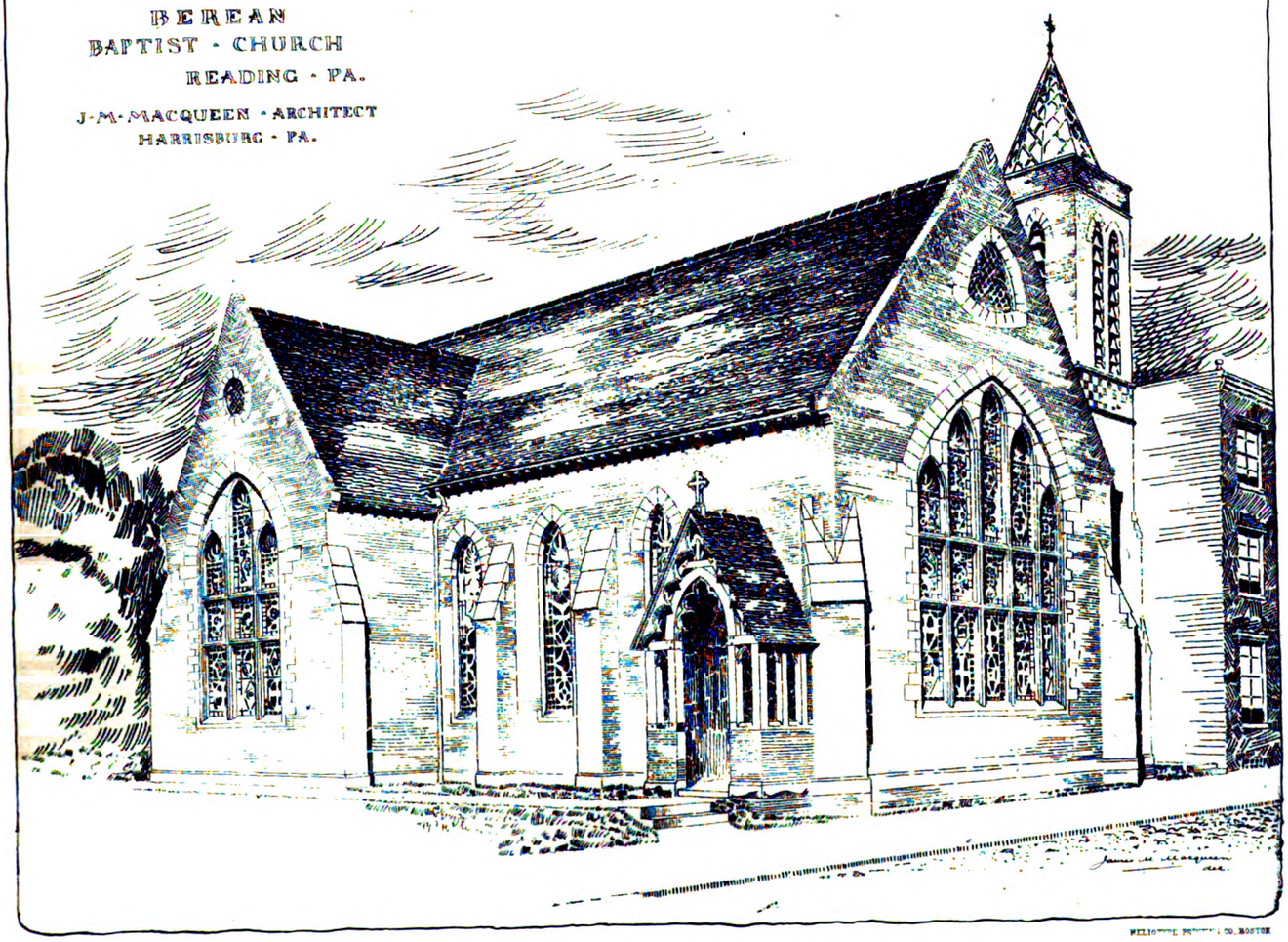
Proposed Residence at Englewood, N.J.

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143 West 23rd St. New York.



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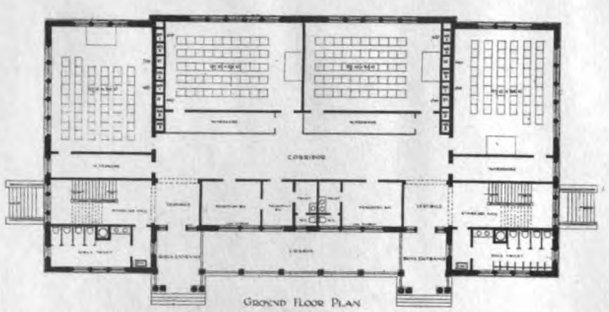


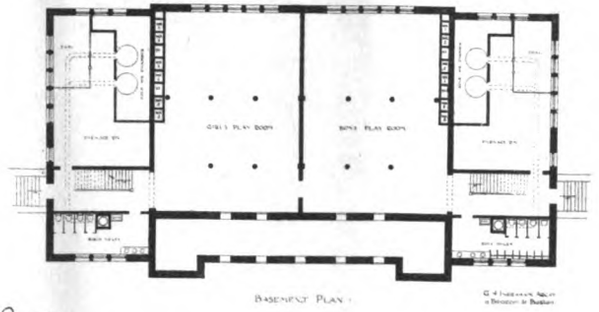
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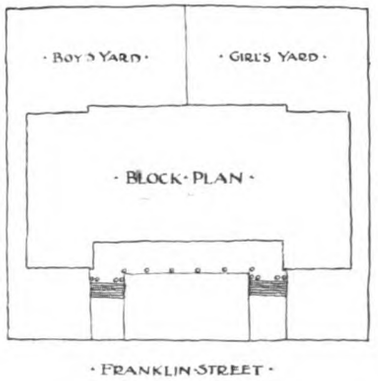
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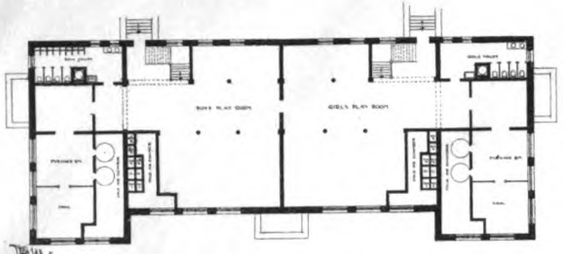




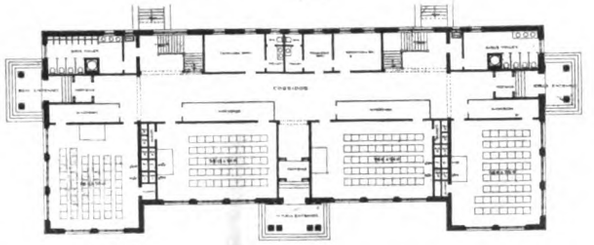
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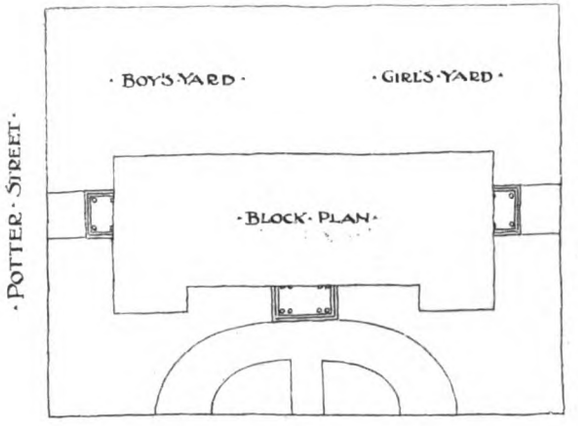
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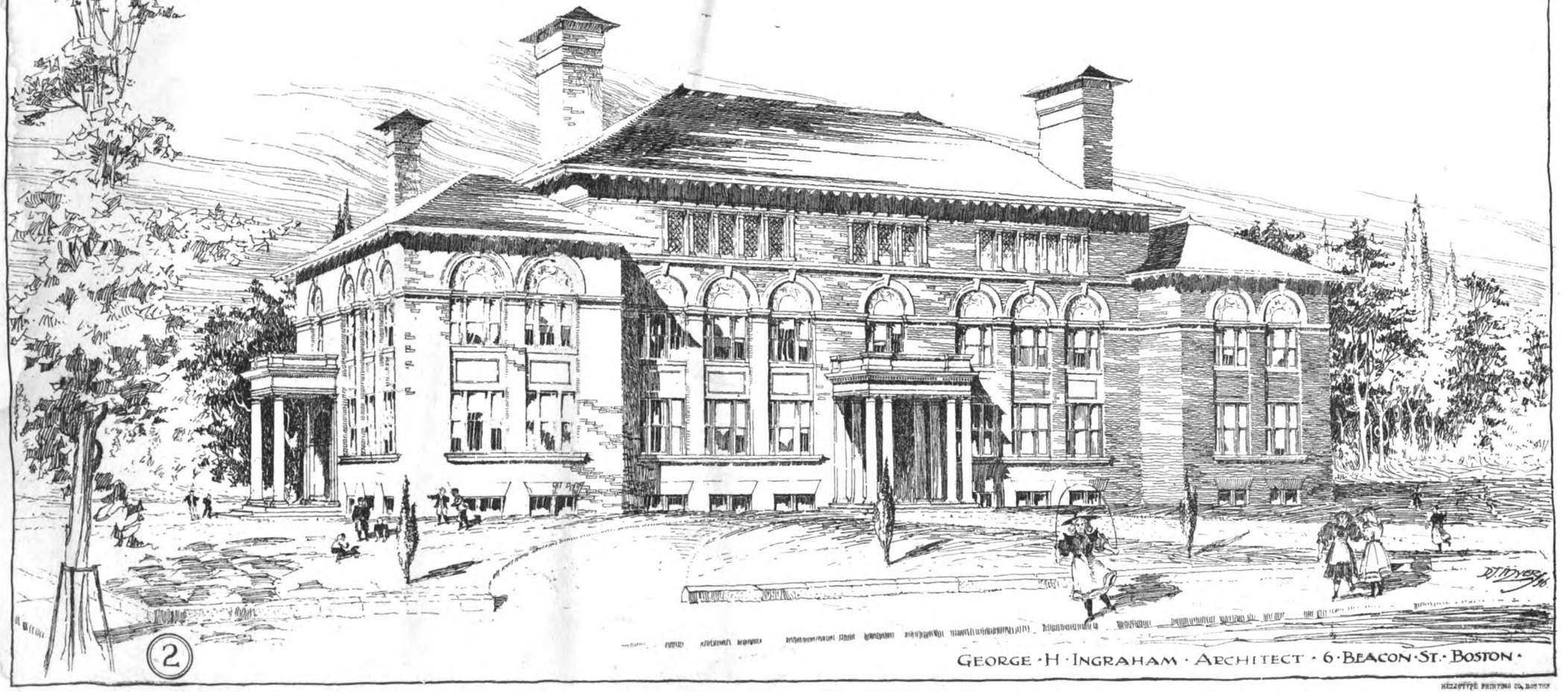


BASEMENT PLAN



FIRST FLOOR PLAN





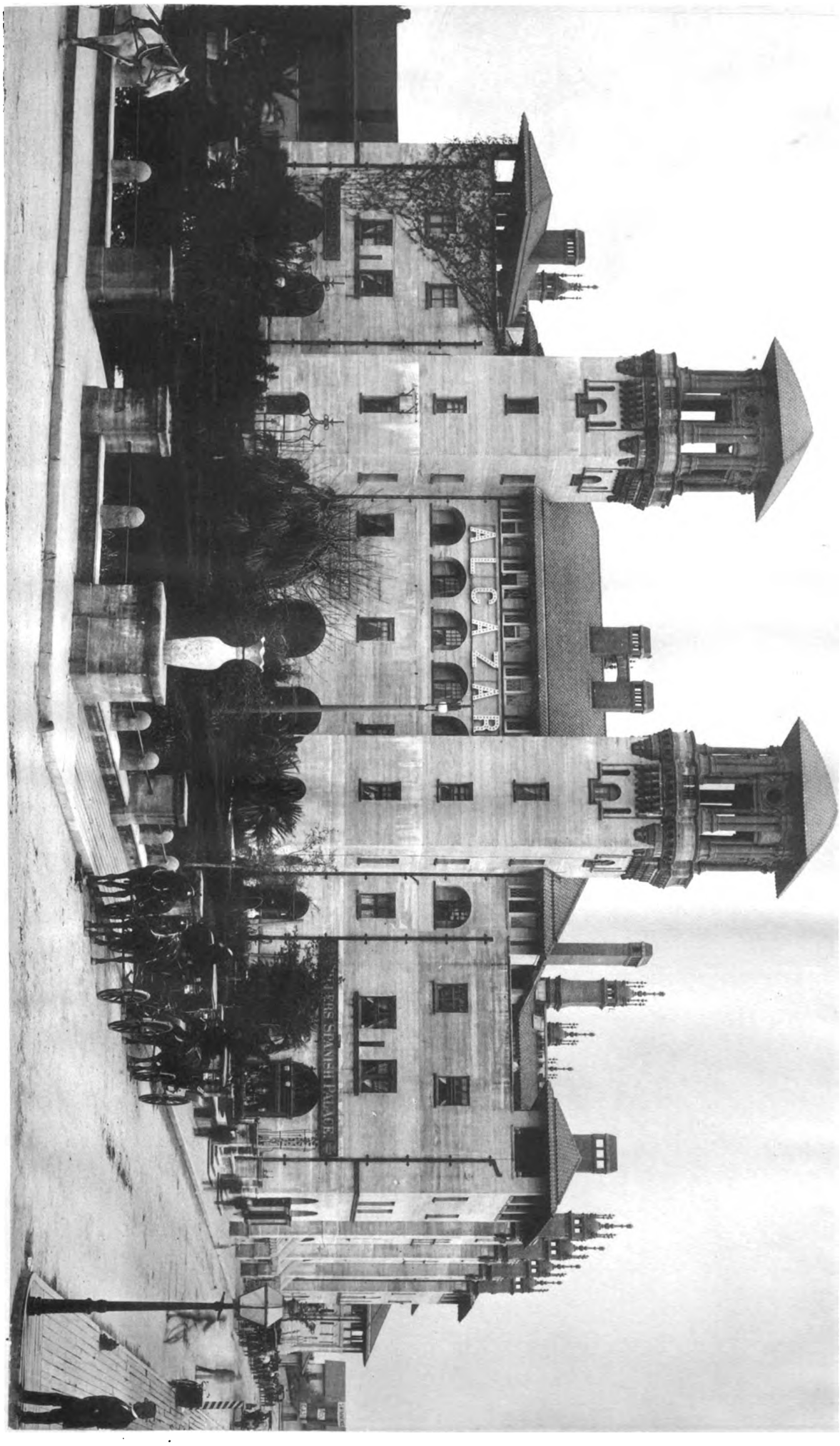
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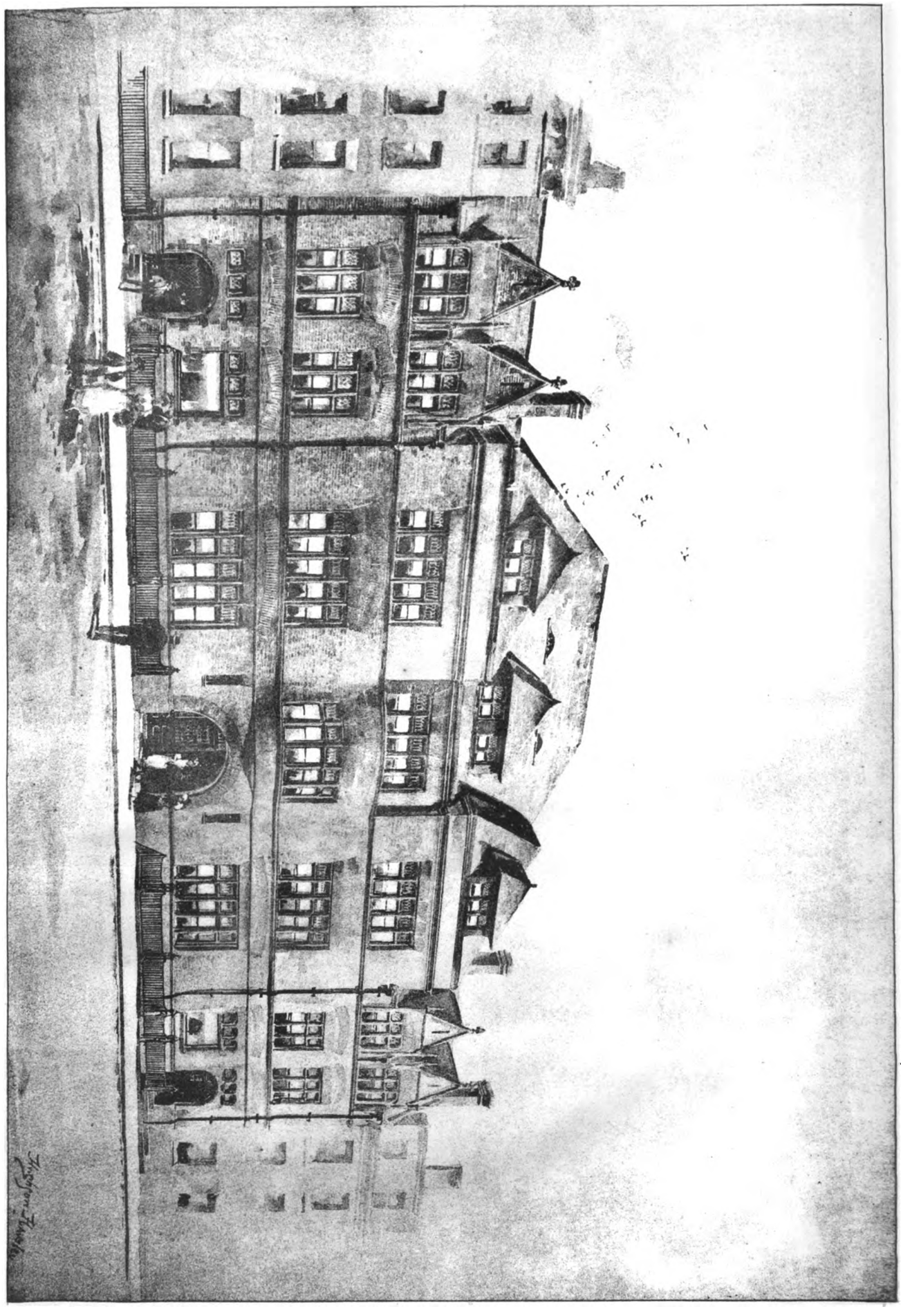
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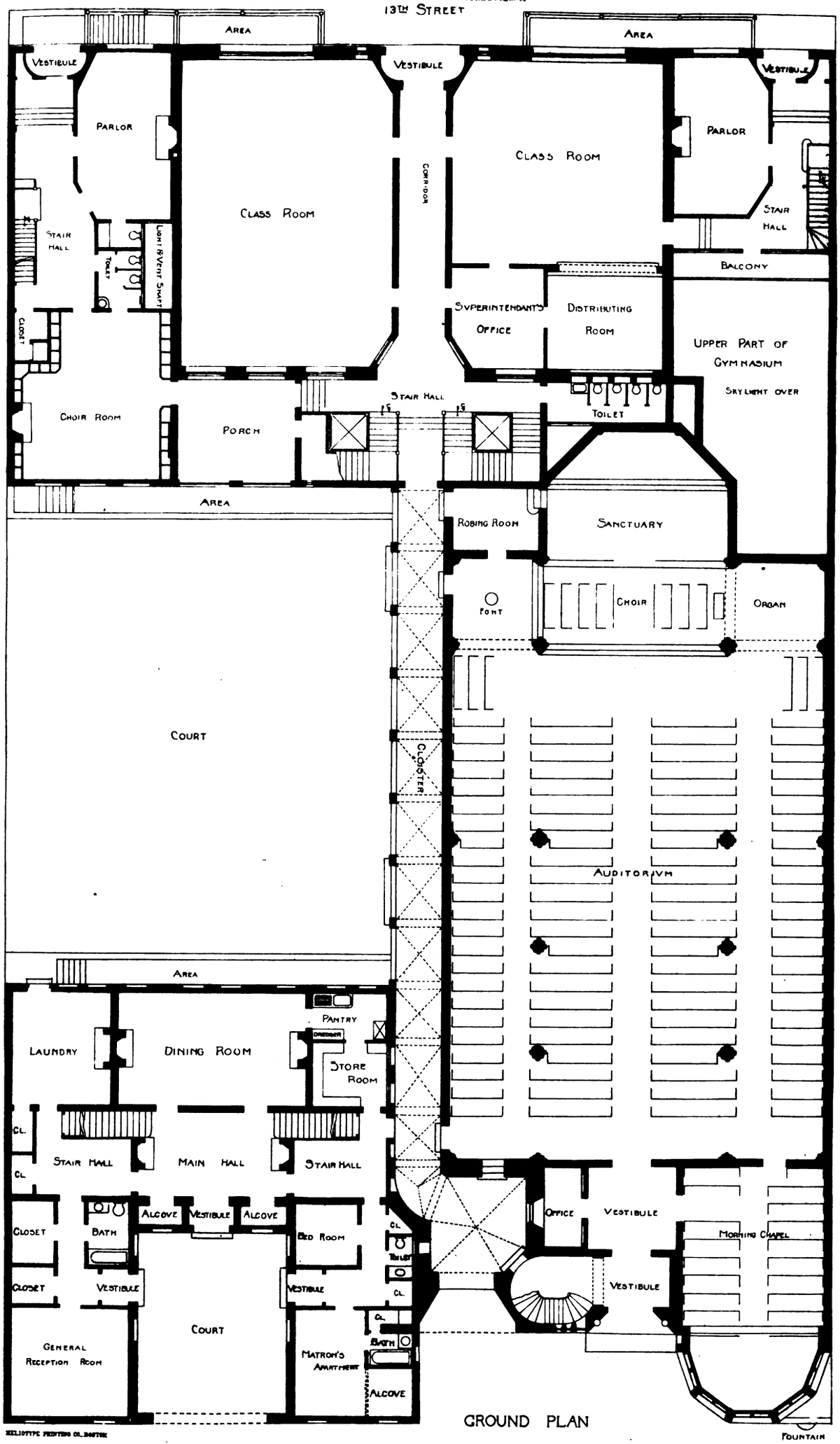
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GROUND PLAN

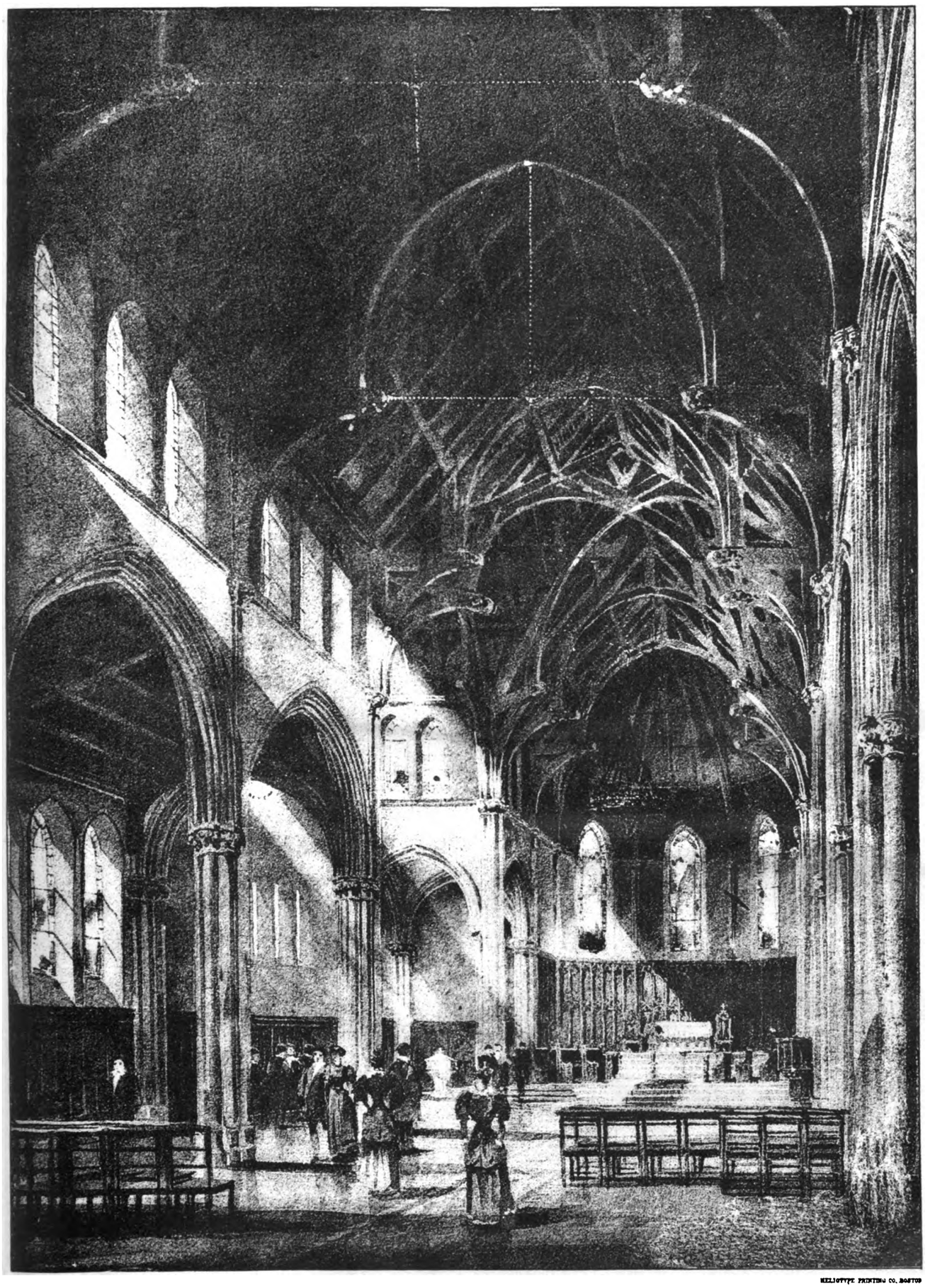
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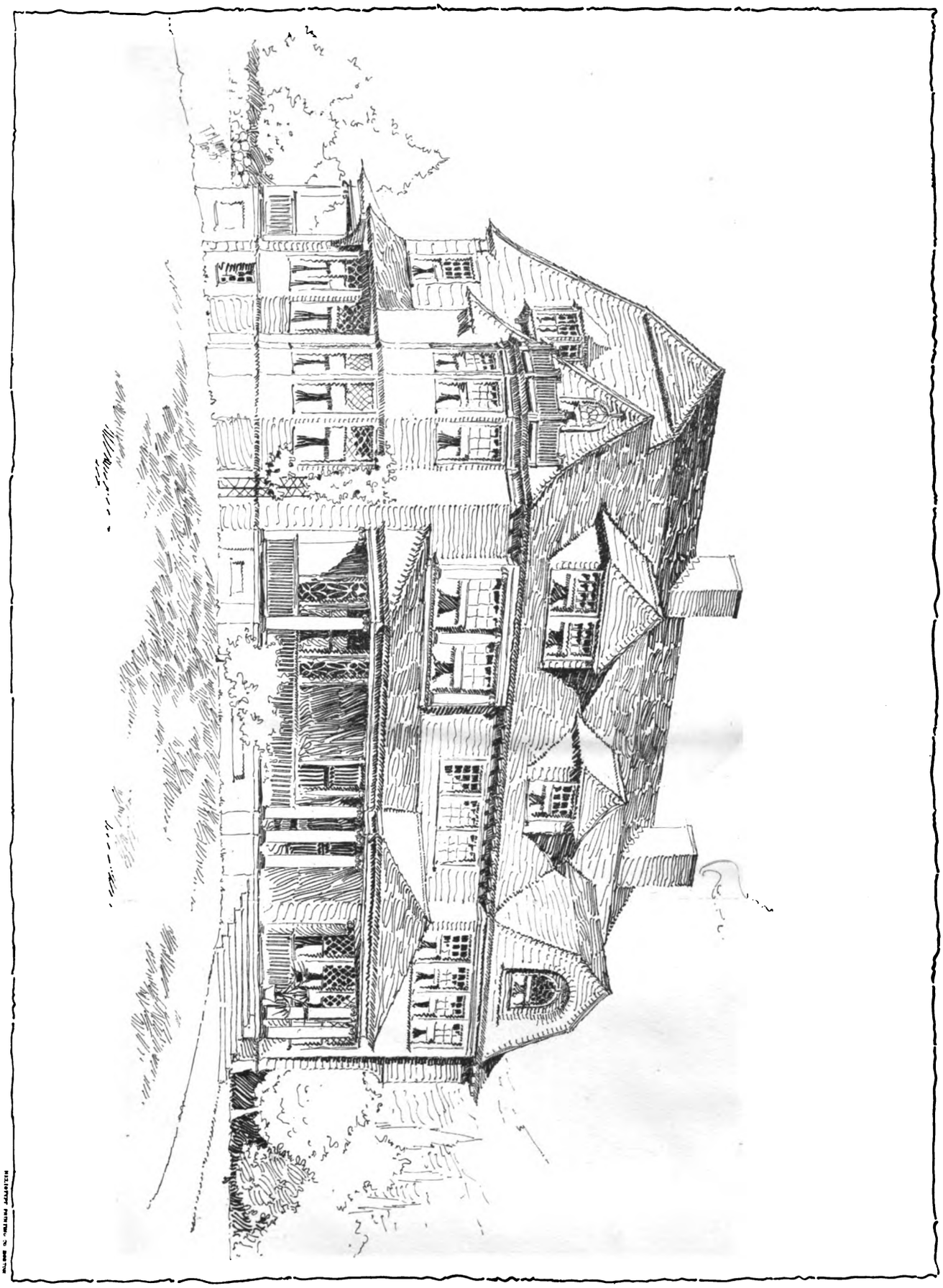
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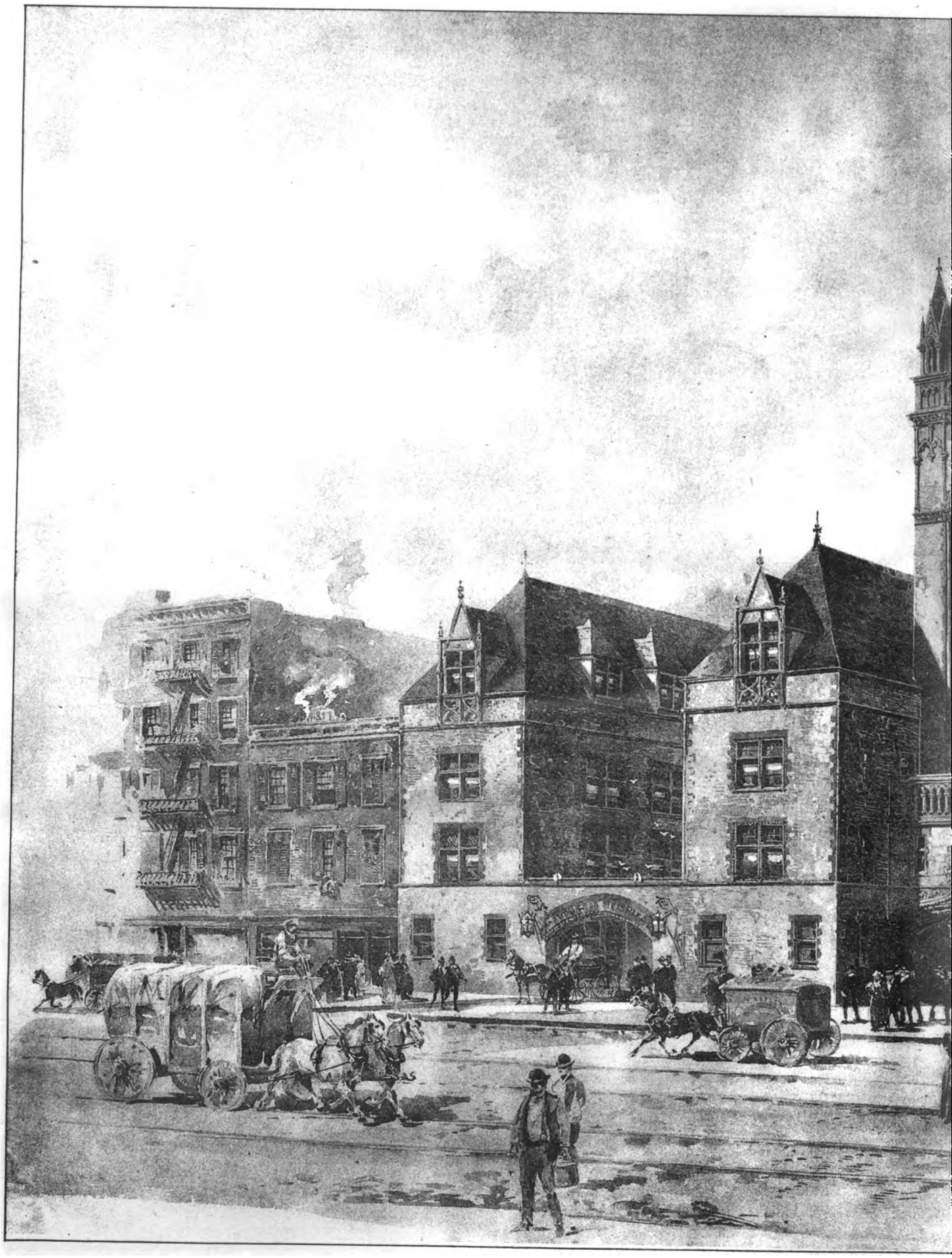


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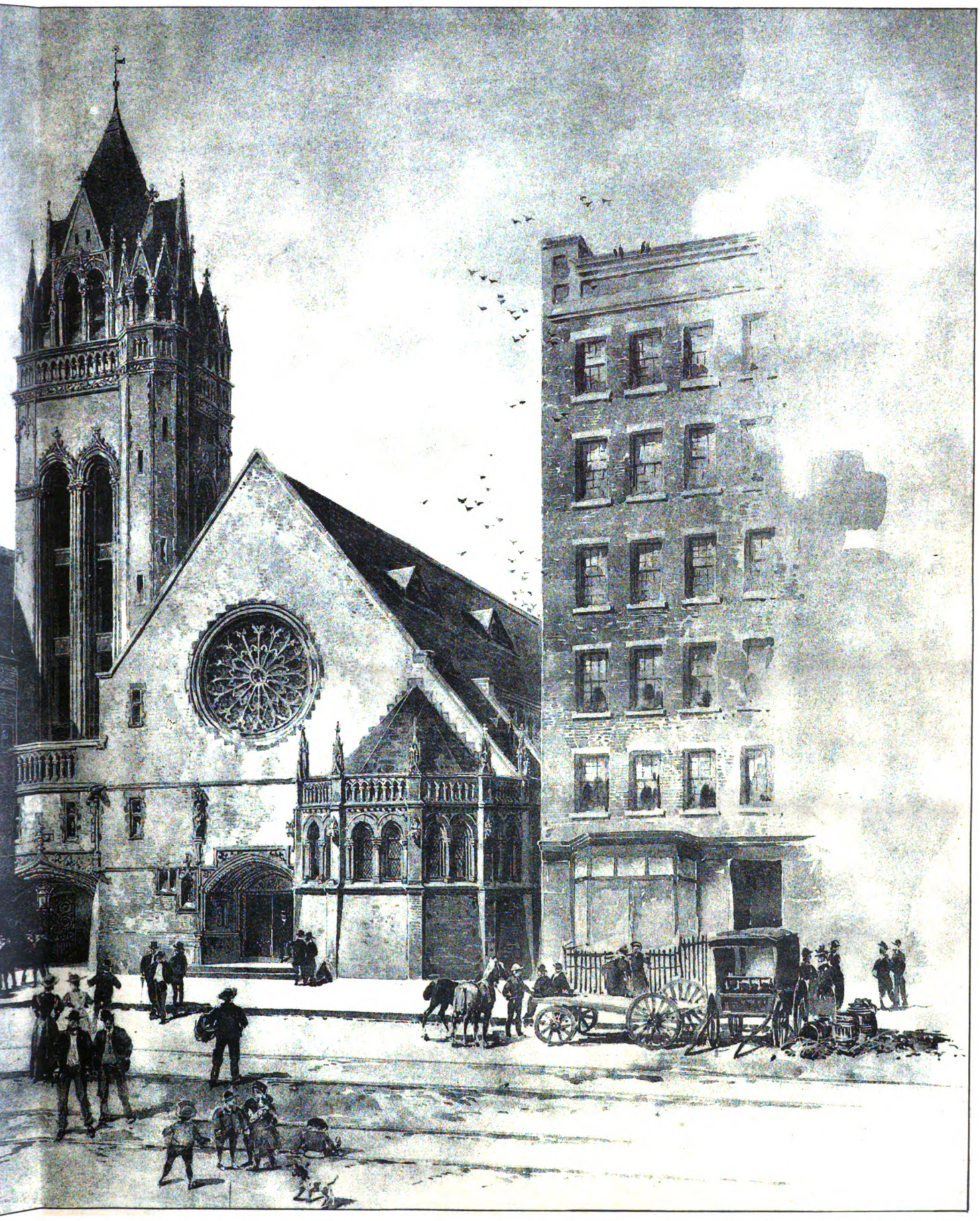


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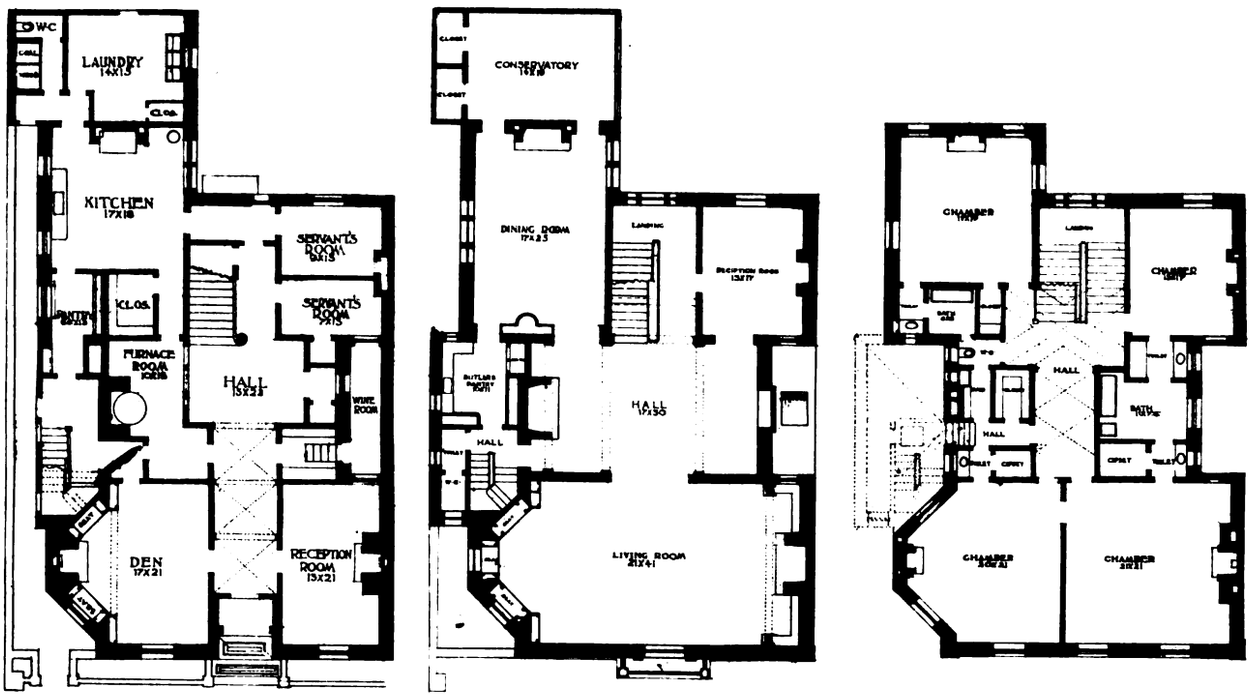
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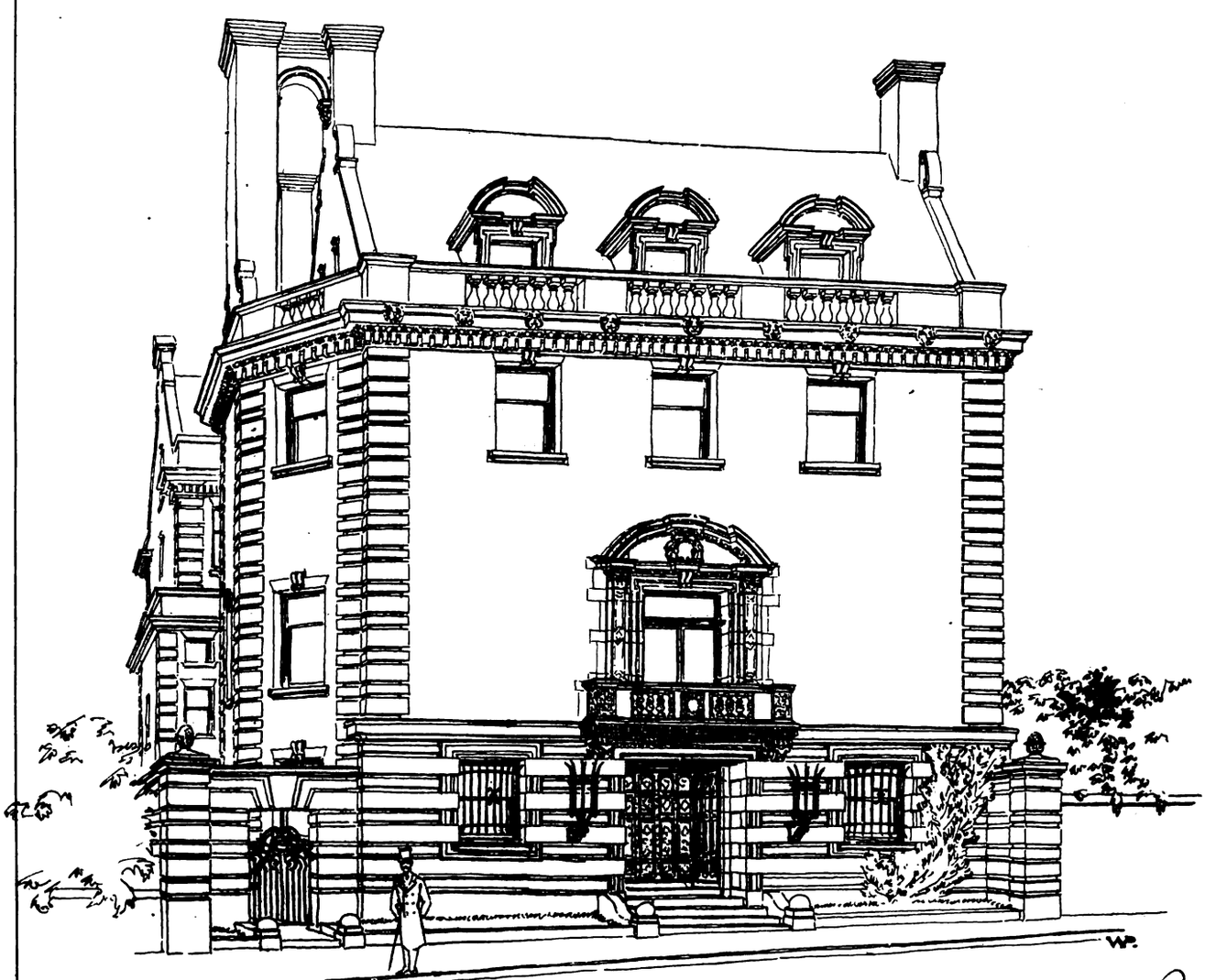
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PLAN OF BASEMENT

PLAN OF PRINCIPAL FLOOR

PLAN OF SECOND FLOOR

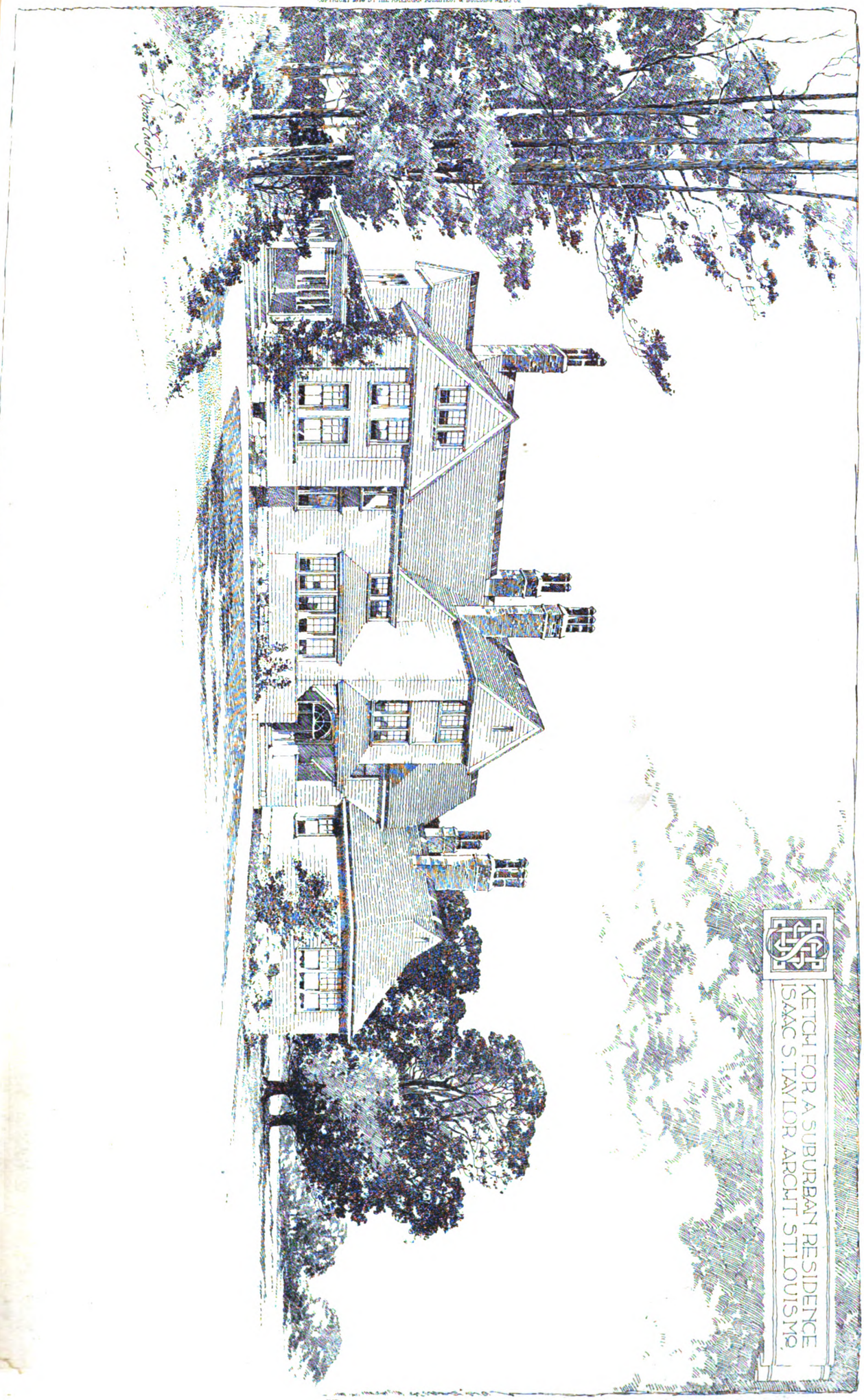


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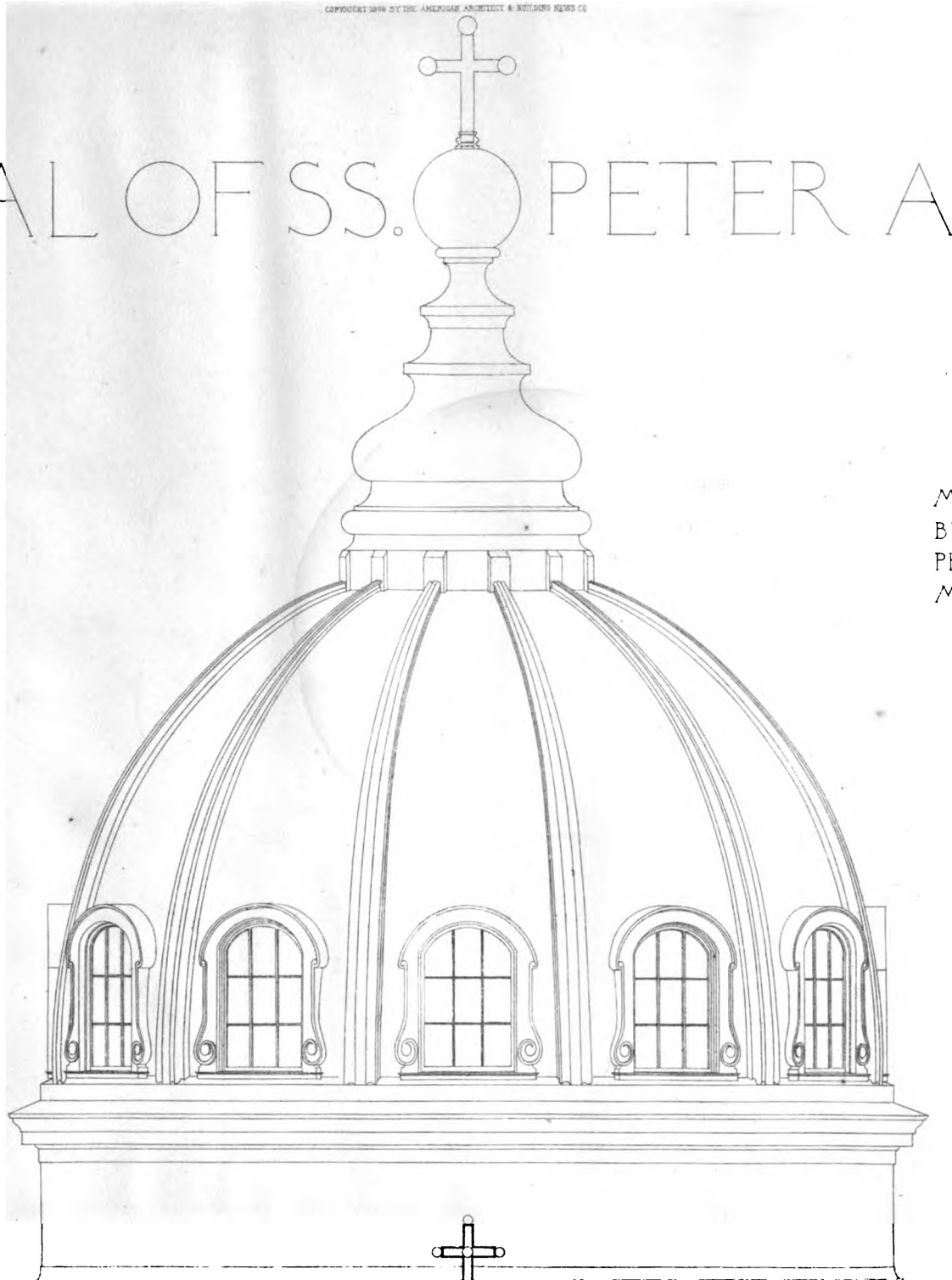
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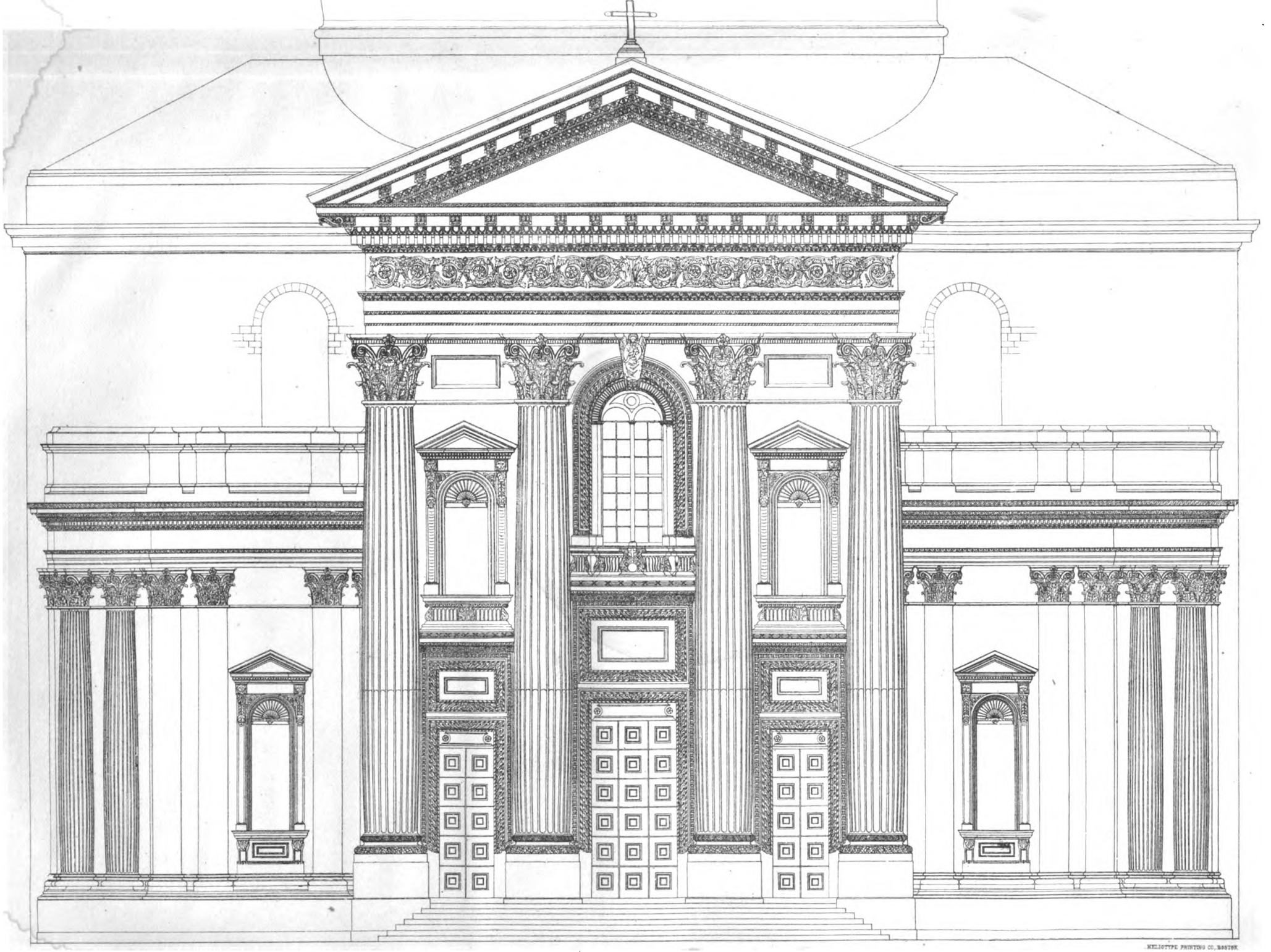
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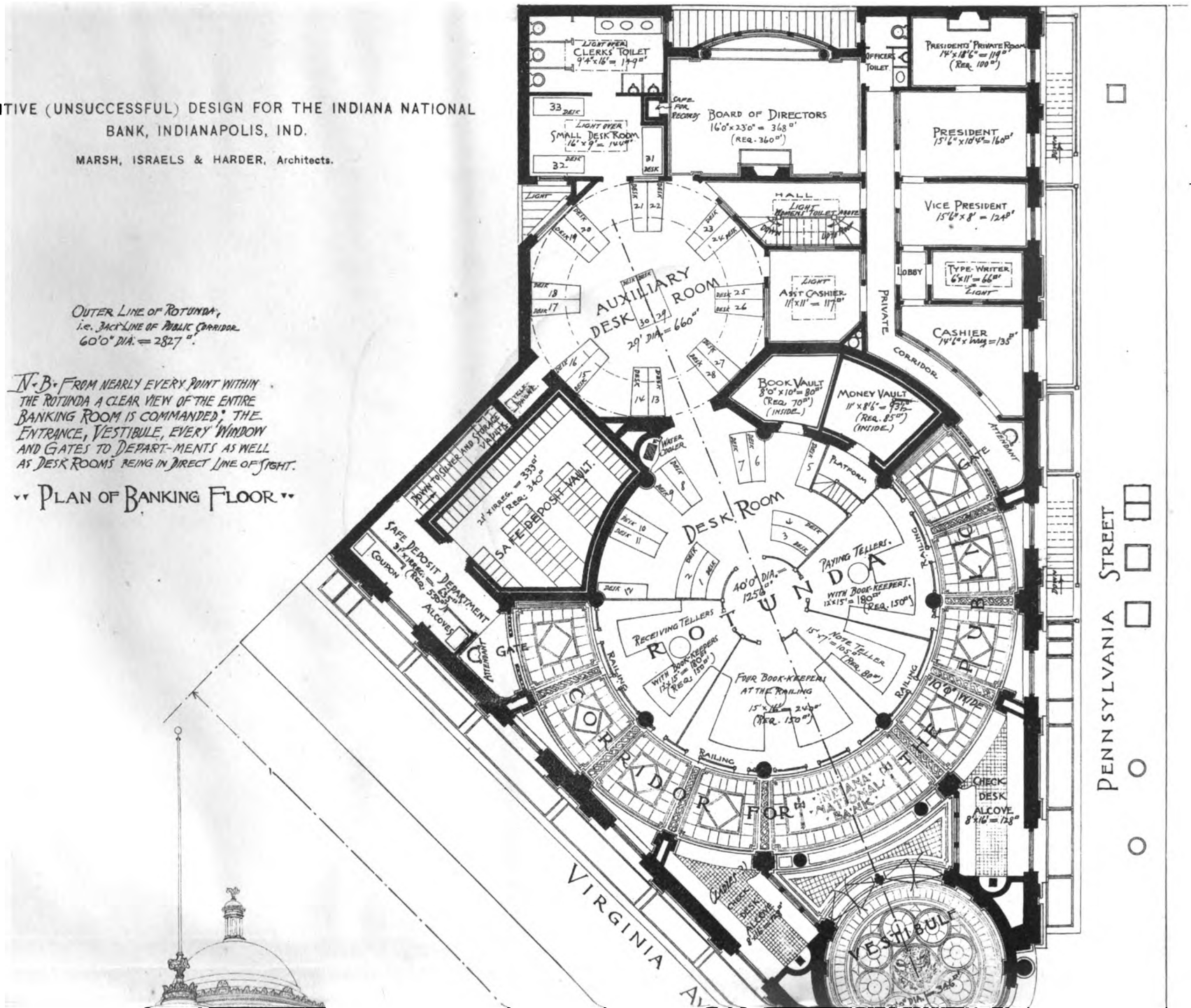
COMPETITIVE (UNSUCCESSFUL) DESIGN FOR THE INDIANA NATIONAL BANK, INDIANAPOLIS, IND.

MARSH, ISRAELS & HARDER, Architects.

OUTER LINE OF ROTUNDA, i.e. BACK LINE OF PUBLIC CORRIDOR. 60'0" DIA. = 2827 □'.

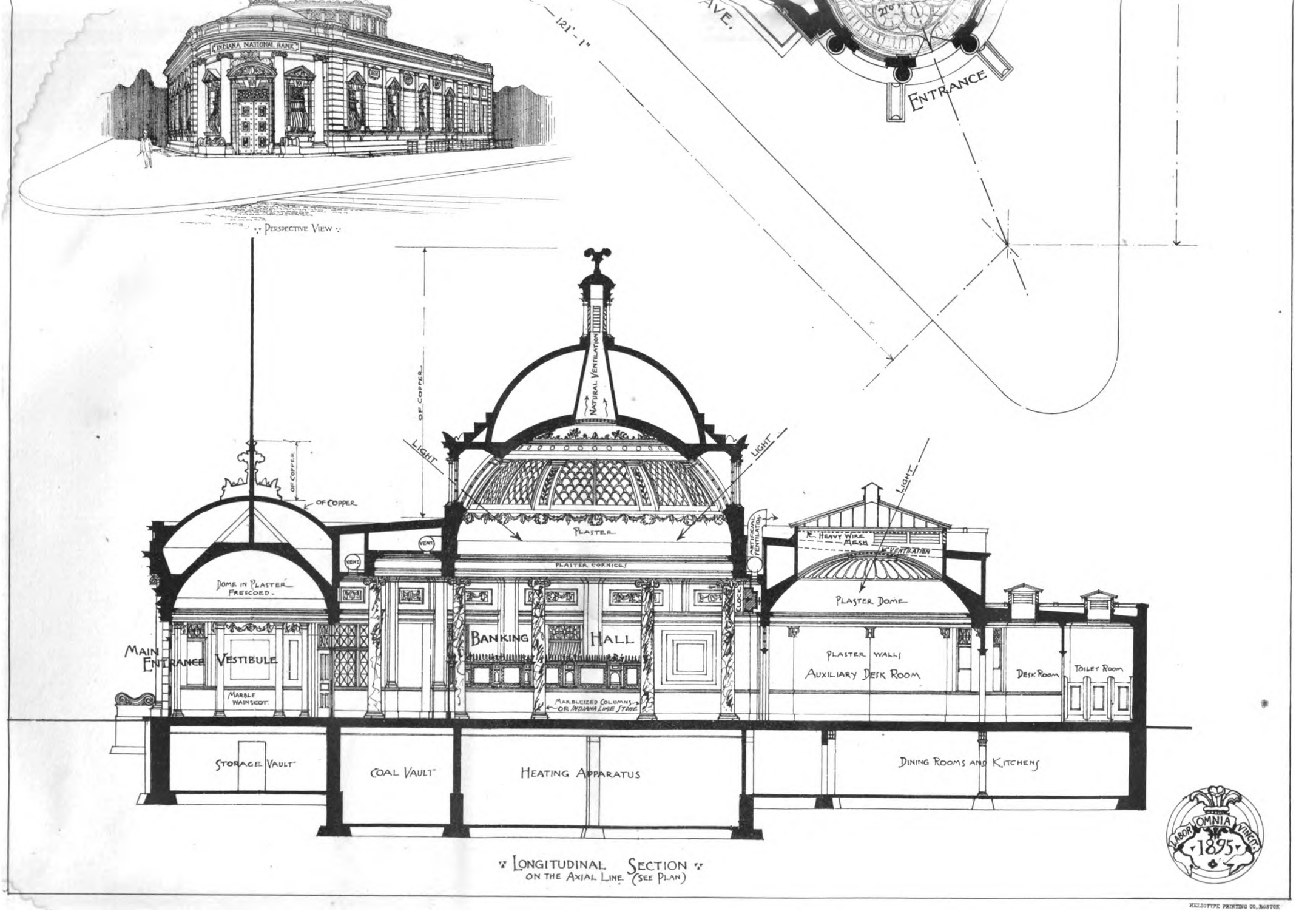
N. B. FROM NEARLY EVERY POINT WITHIN THE ROTUNDA A CLEAR VIEW OF THE ENTIRE BANKING ROOM IS COMMANDED; THE ENTRANCE, VESTIBULE, EVERY WINDOW AND GATES TO DEPART-MENTS AS WELL AS DESK ROOMS BEING IN DIRECT LINE OF SIGHT.

PLAN OF BANKING FLOOR



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Perspective View



Longitudinal Section
On the Axial Line. (See Plan)

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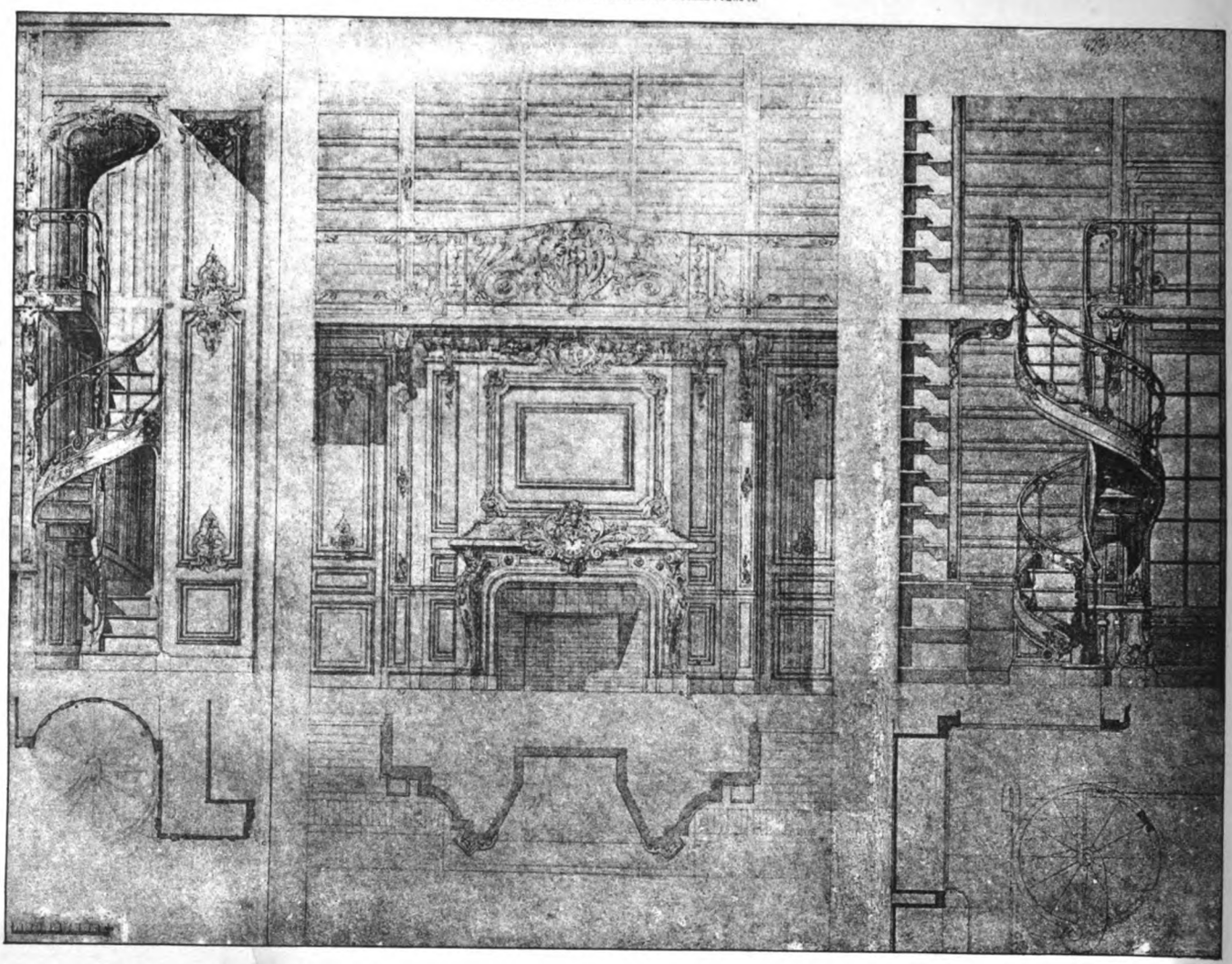
BRUCE PRICE, Architect.

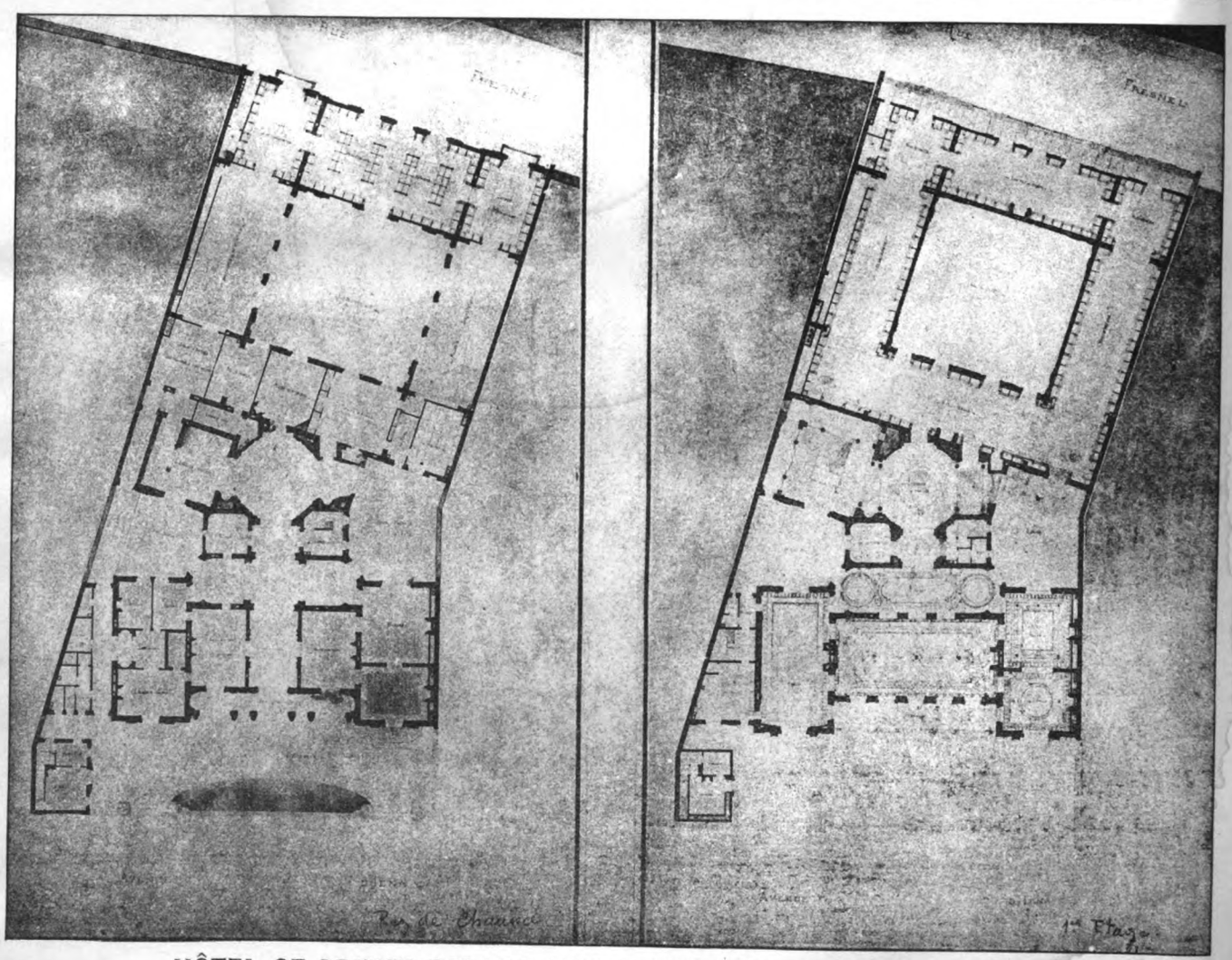
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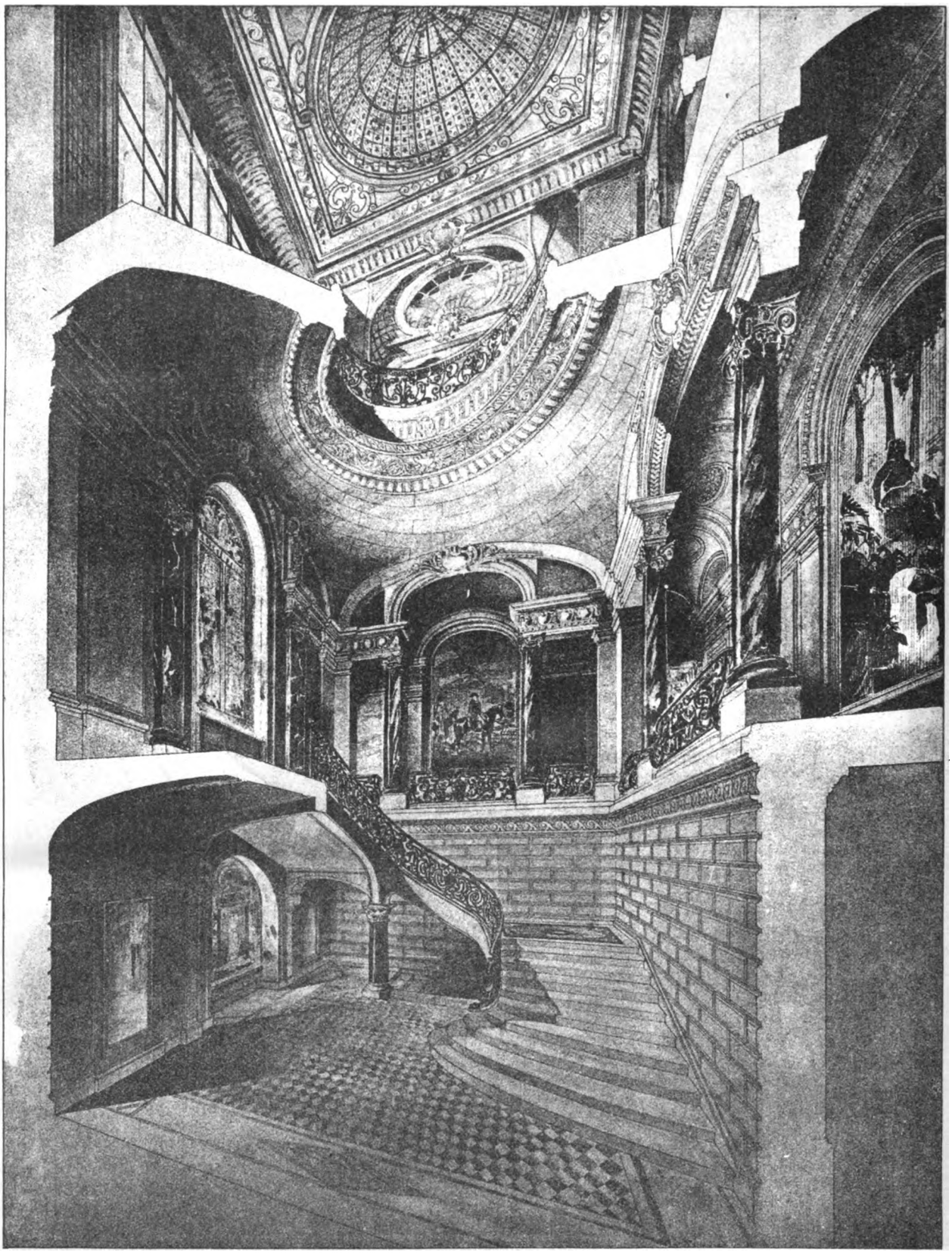
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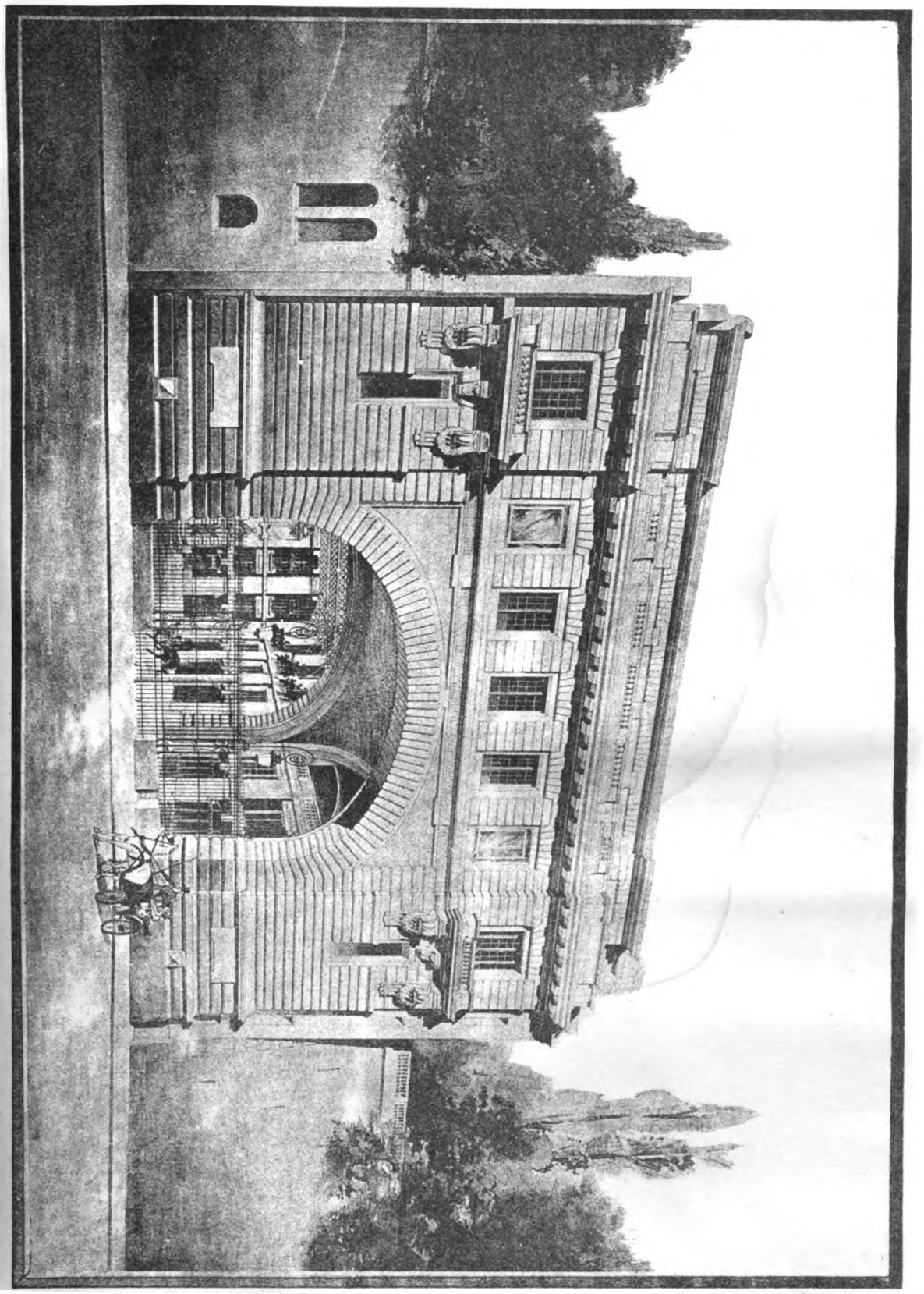
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MAIN STAIRCASE.

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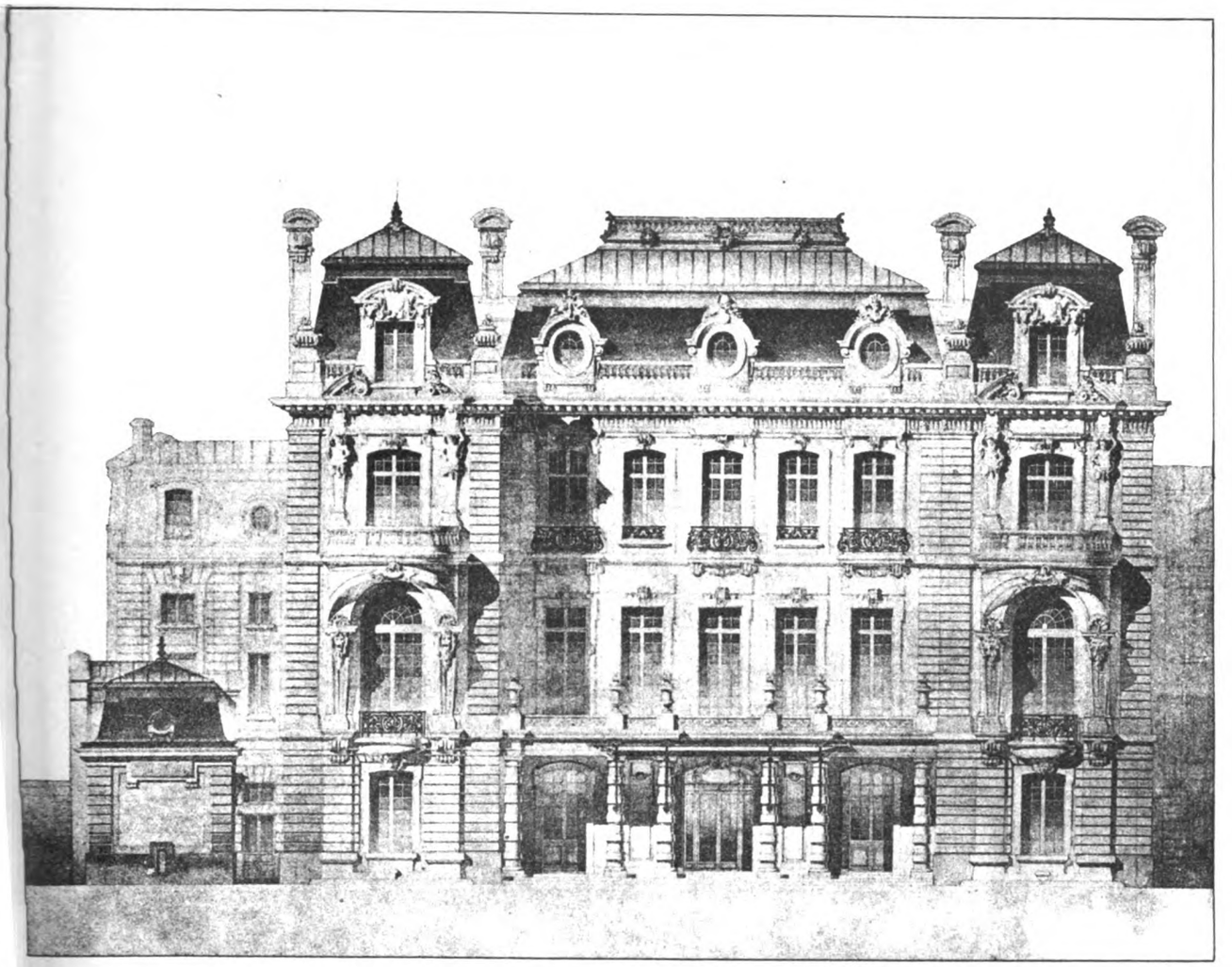
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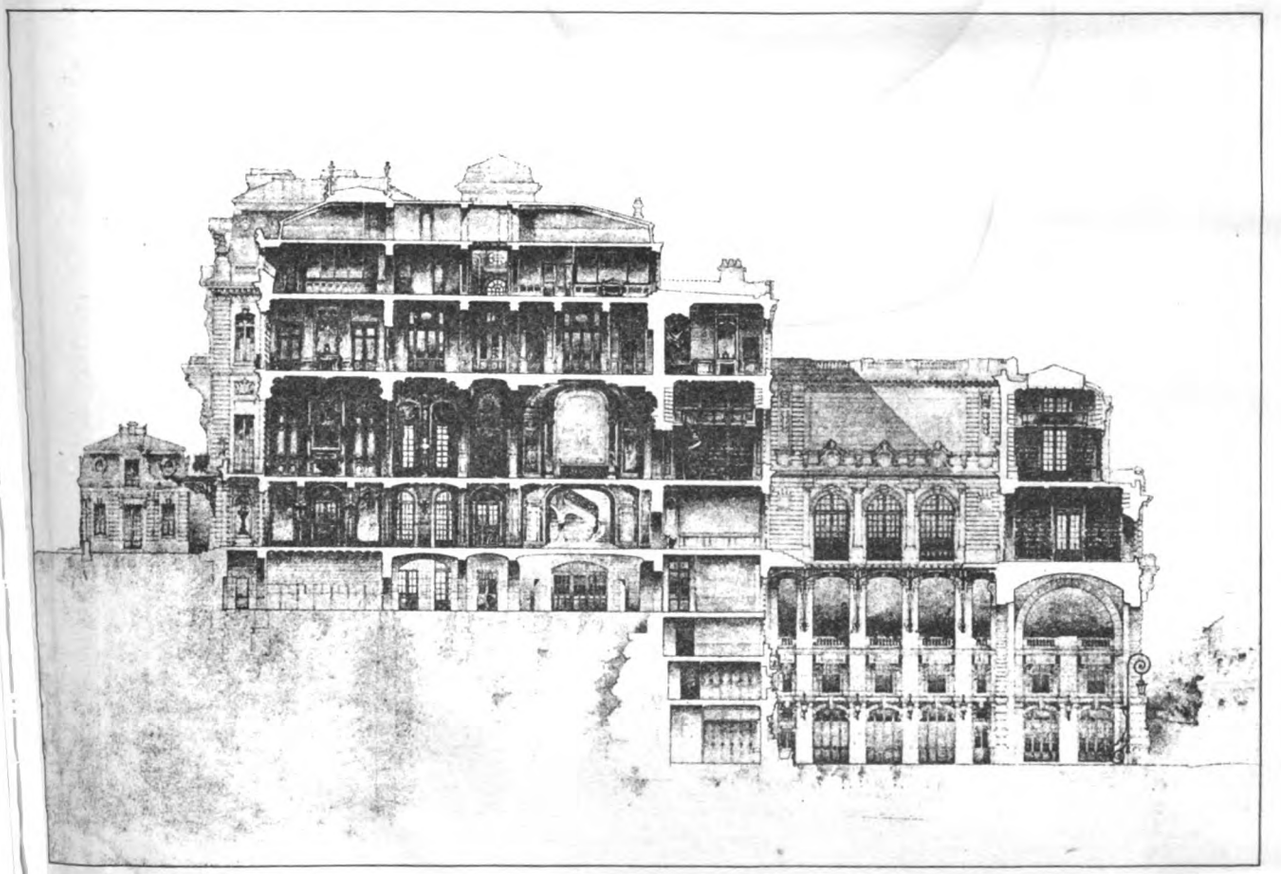
FAÇADE ON THE RUE FRESNEL.

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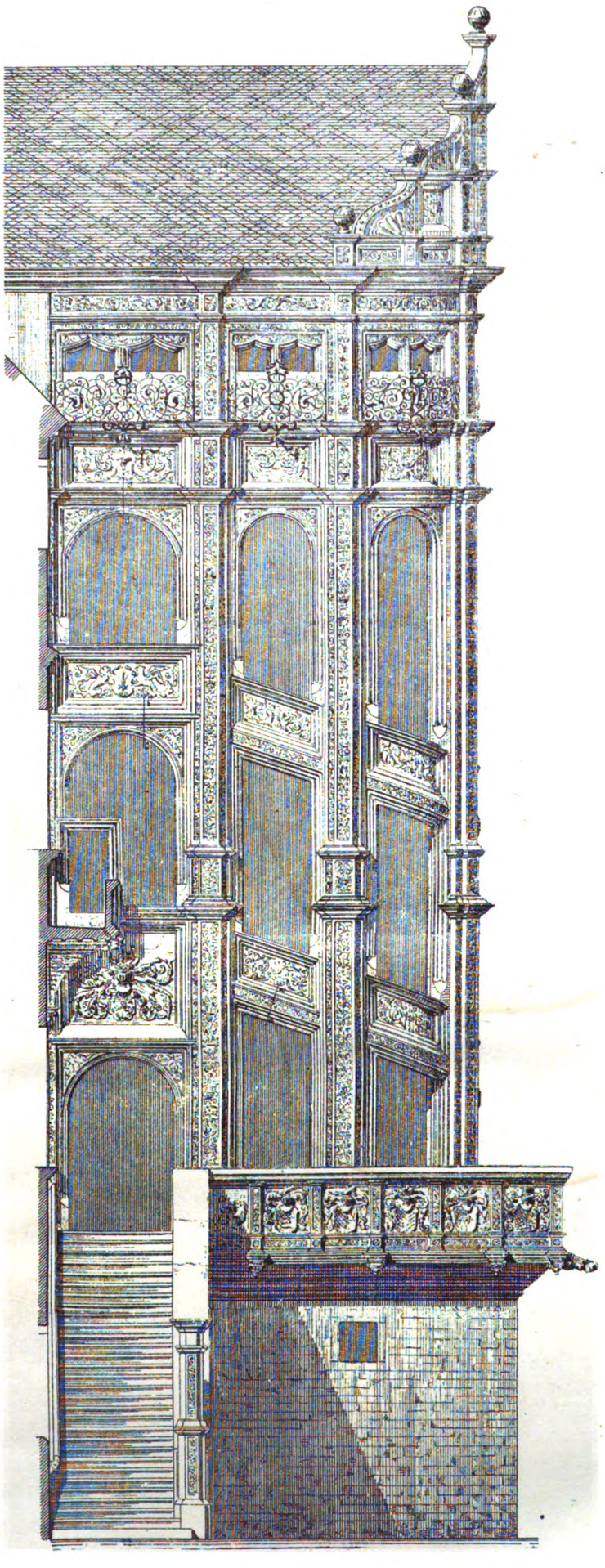


FIG. 60.

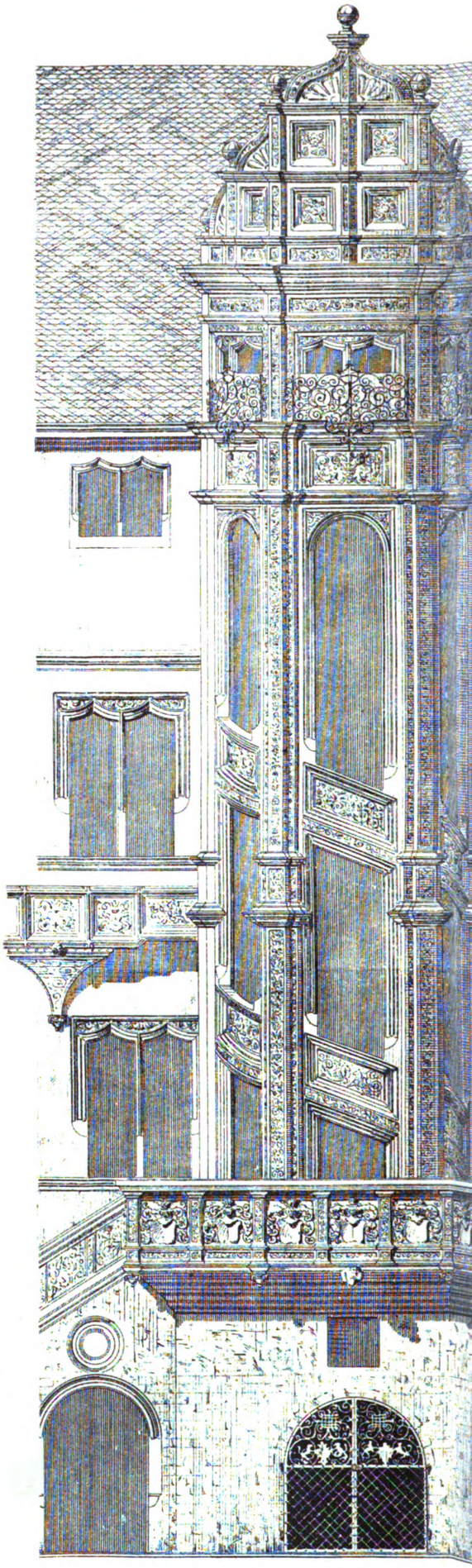
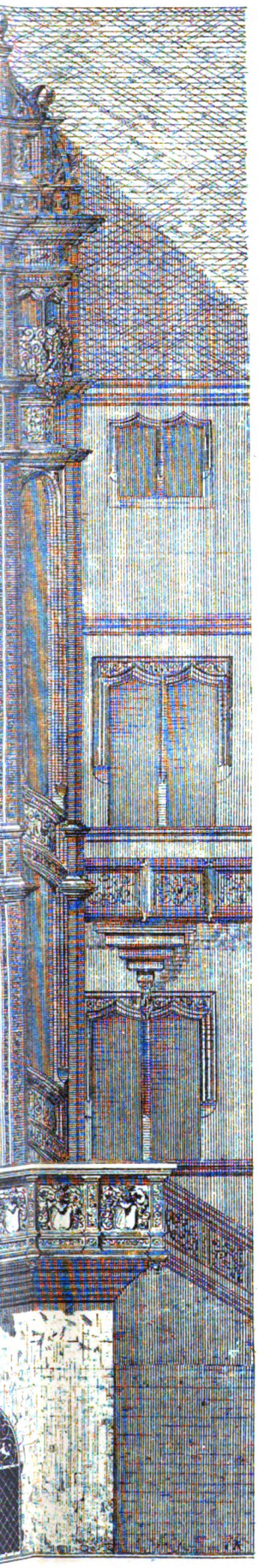


FIG. 57.

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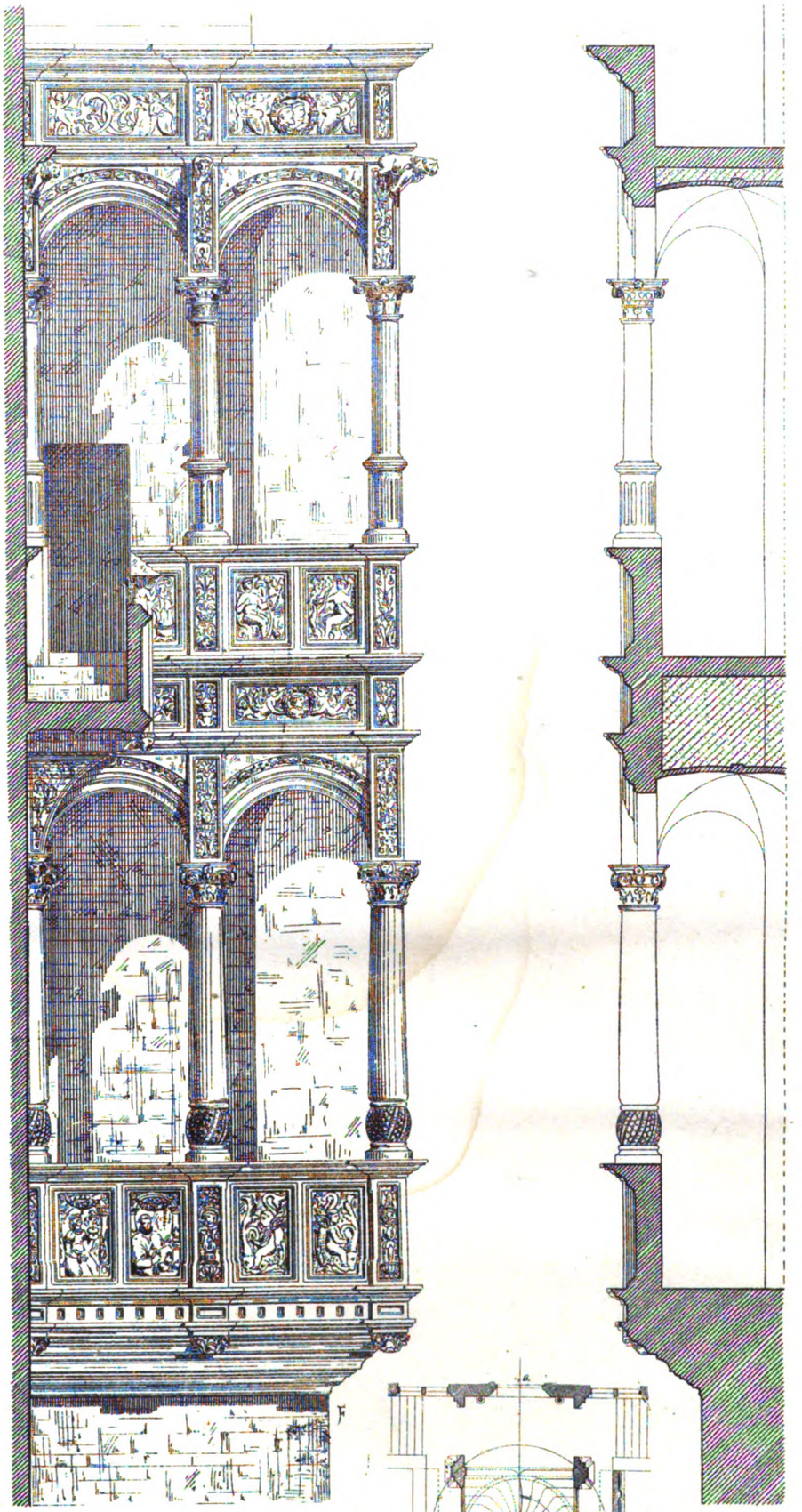


FIG. 65.

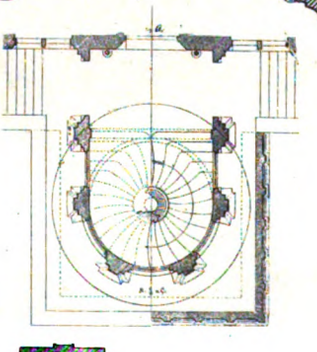




FIG 61

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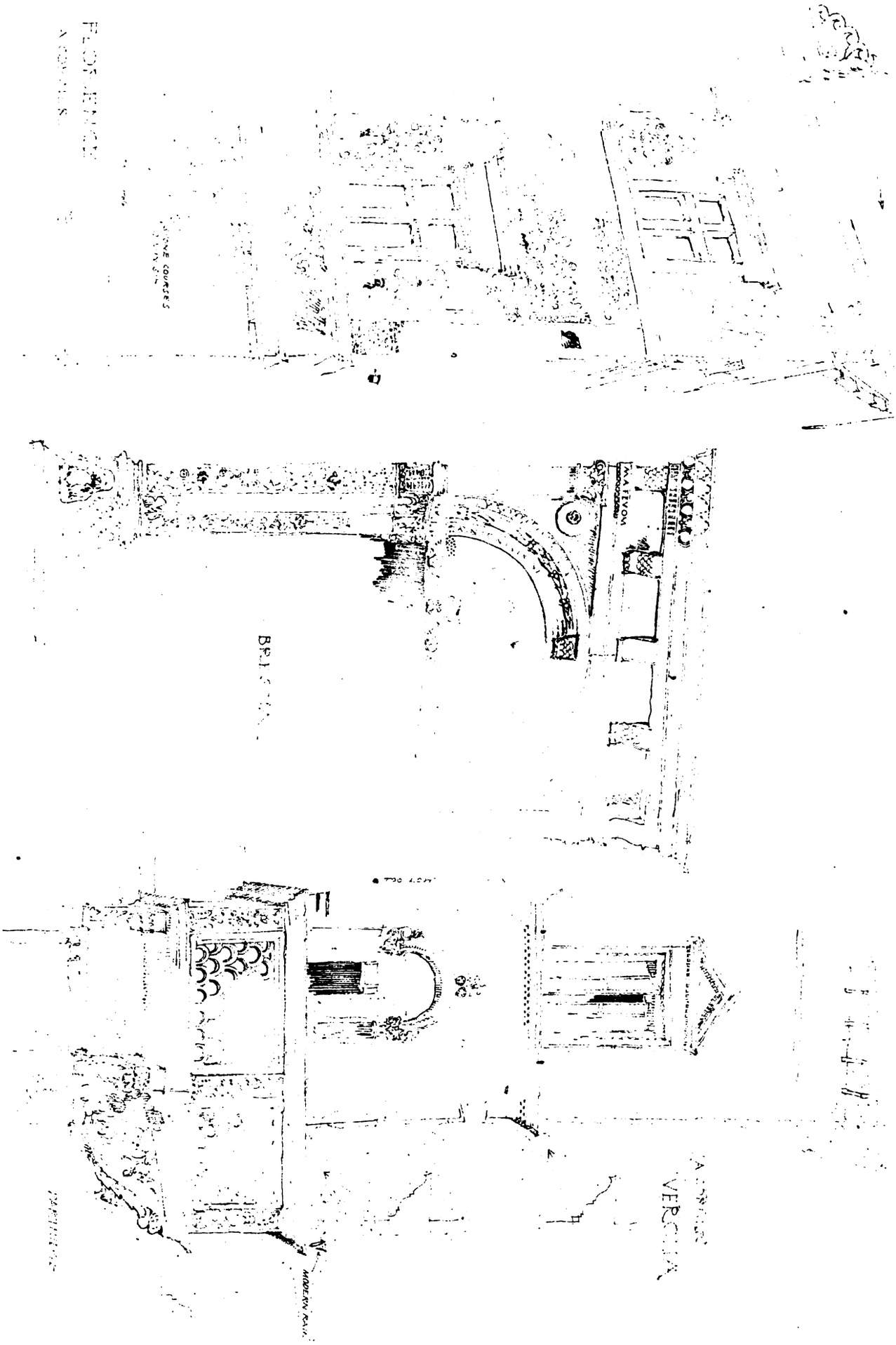
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ADLER & SULLIVAN, Architects.

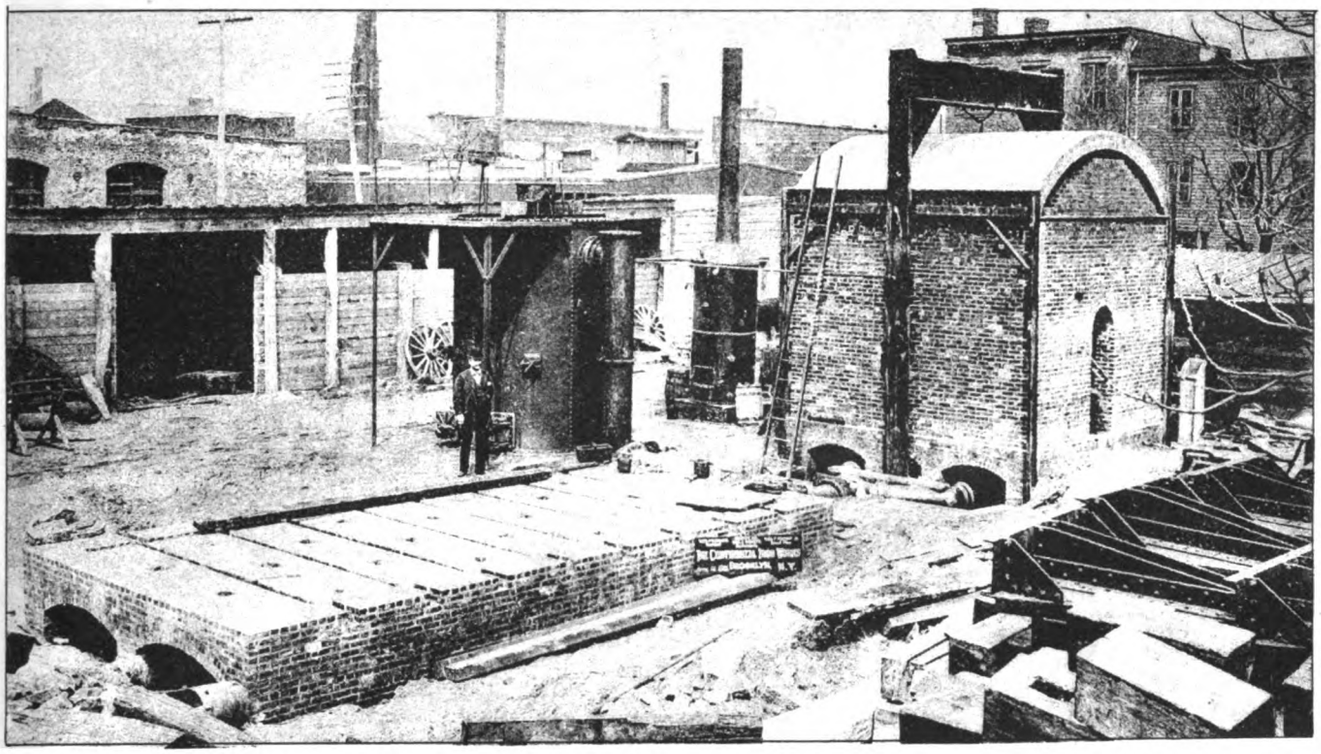
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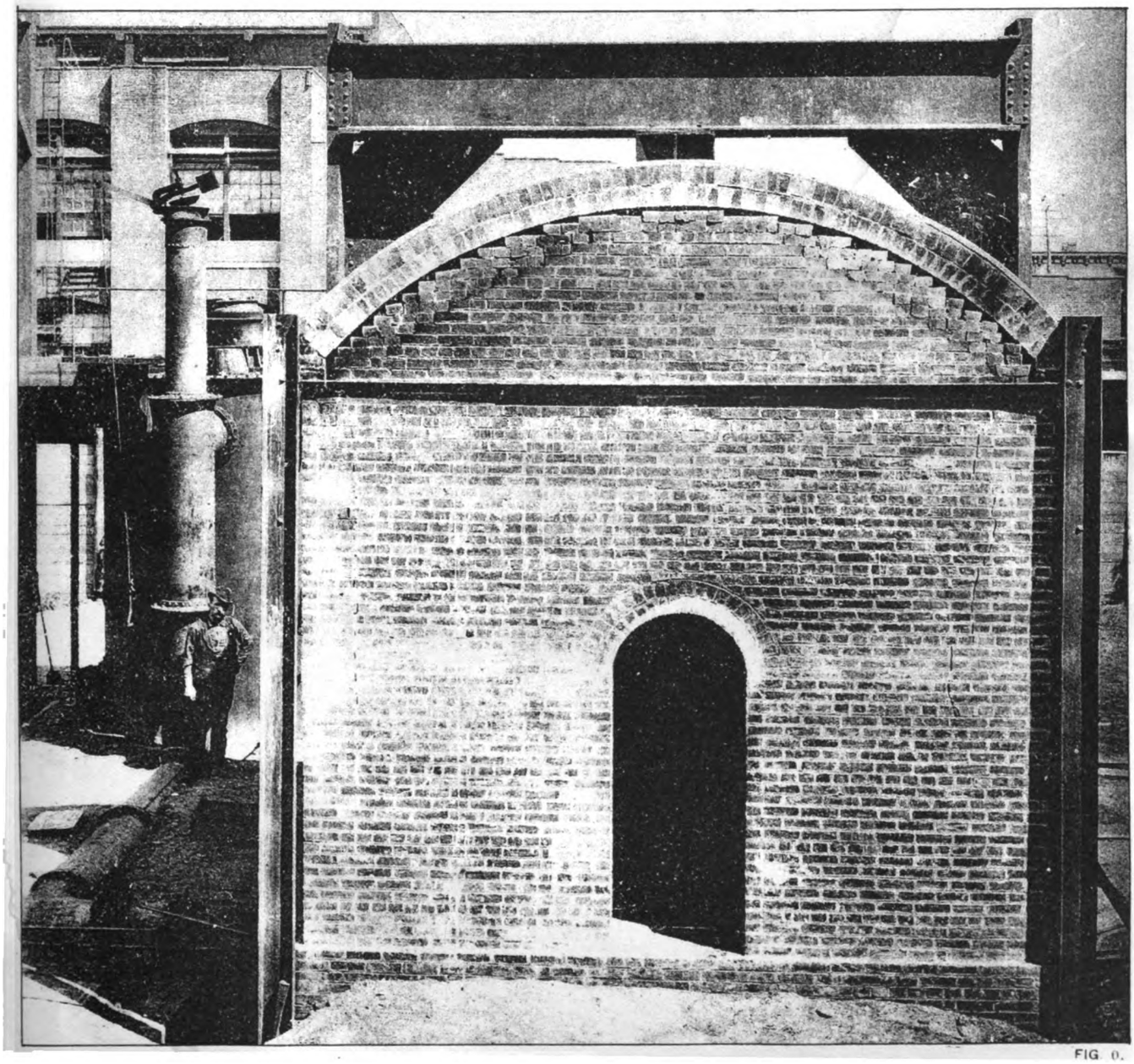


FIG. 0.

FURNACE USED BY THE COMMITTEE ON FIREPROOFING TESTS.

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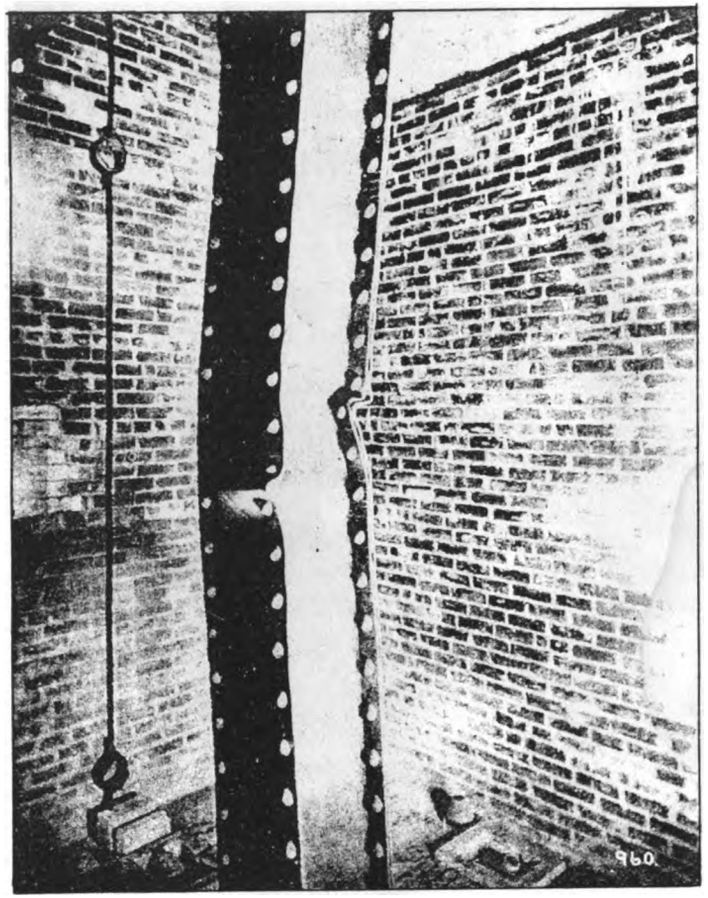


FIG. 3.

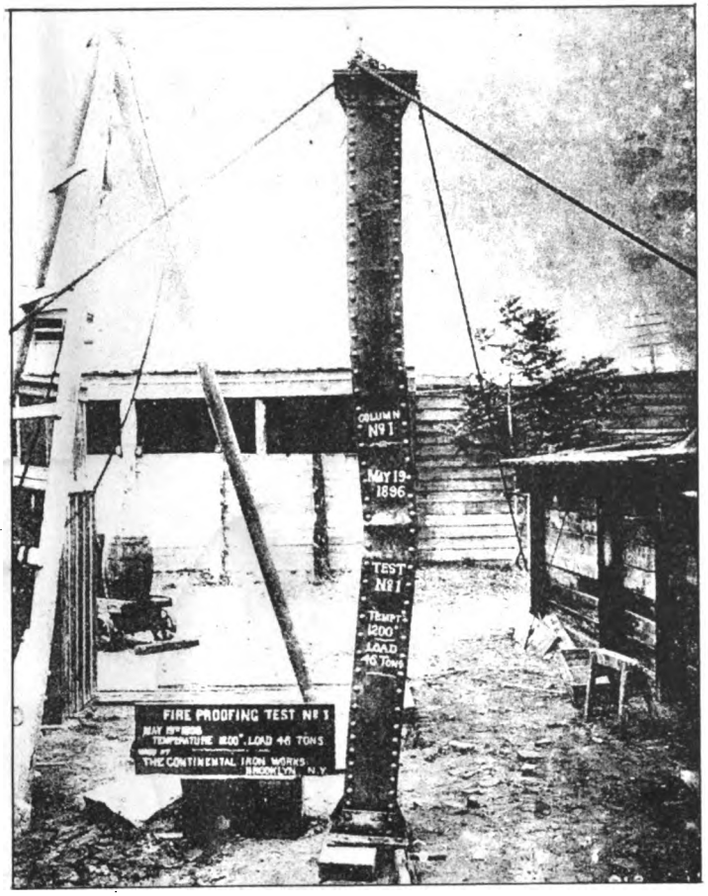


FIG. 4.

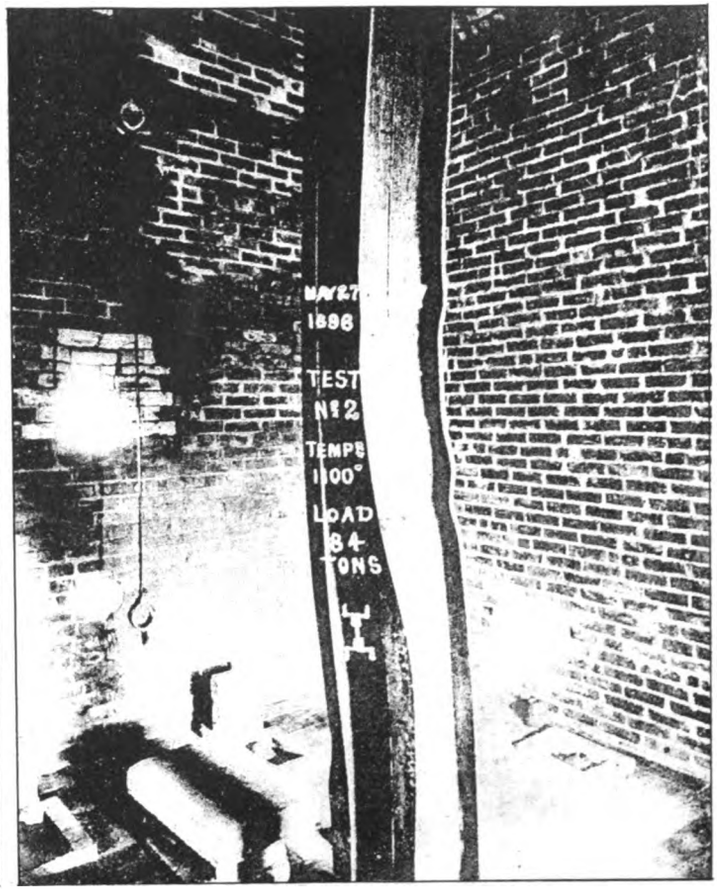
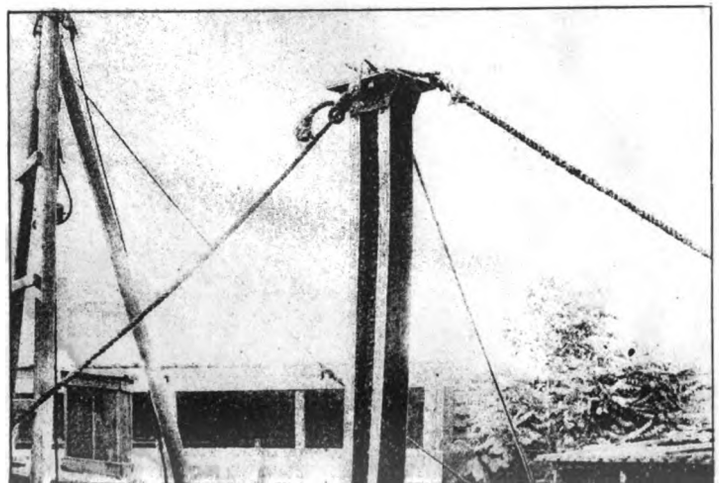
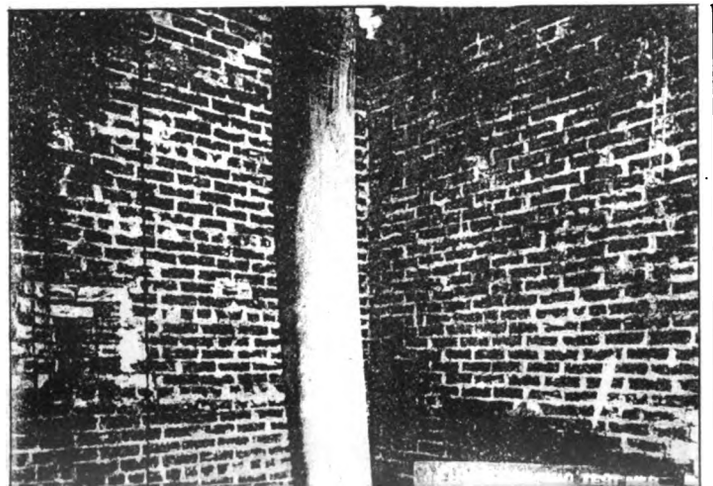


FIG. 7.







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FIG. 8.

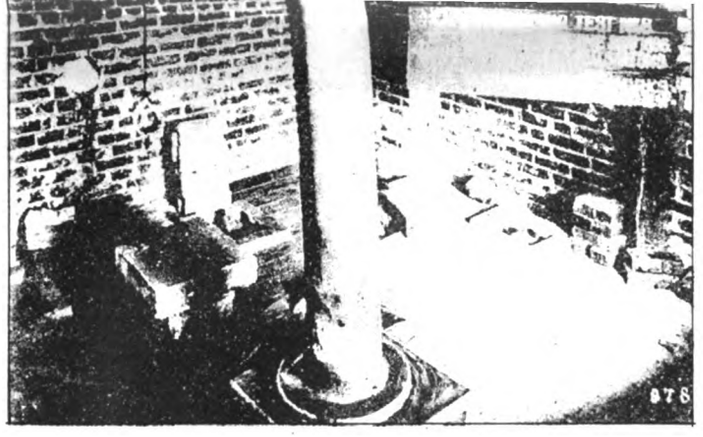


FIG. 10.



FIG. 11.



FIG. 12.

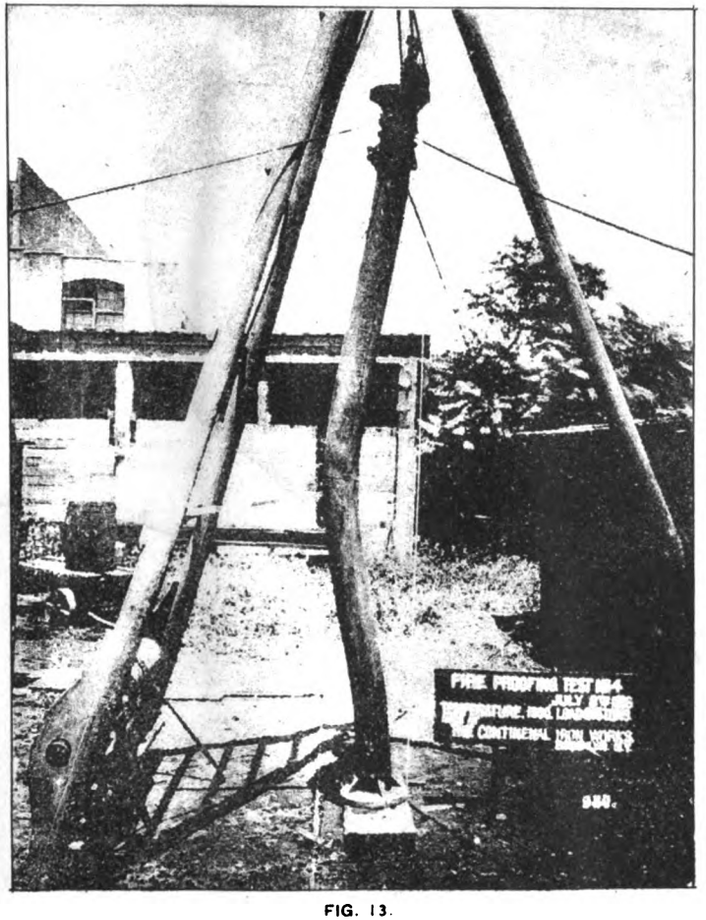


FIG. 13.

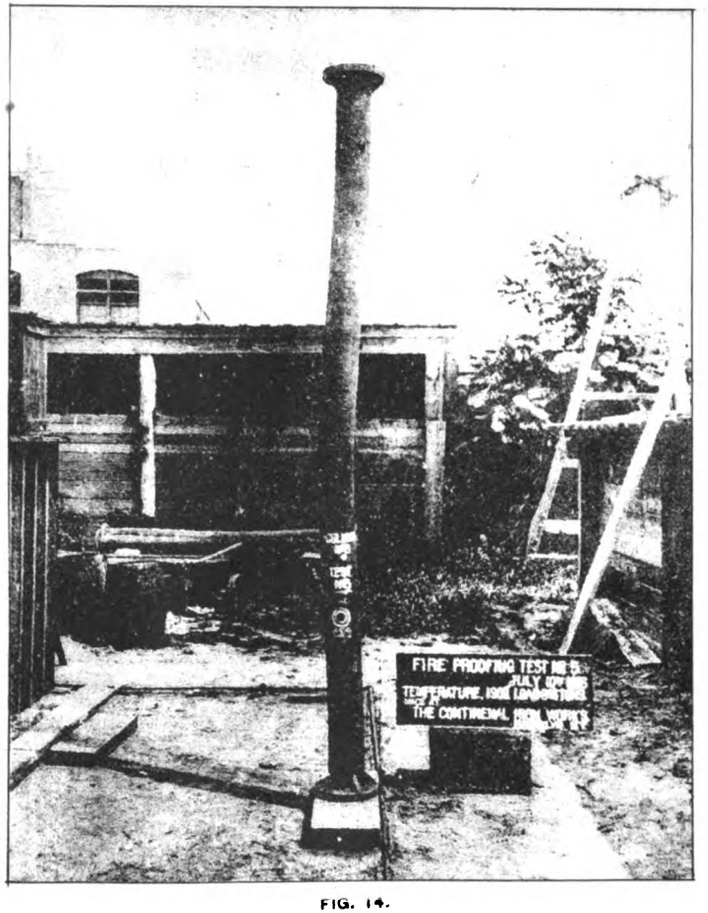


FIG. 14.

RESULTS OBTAINED BY THE COMMITTEE ON FIREPROOFING TESTS.

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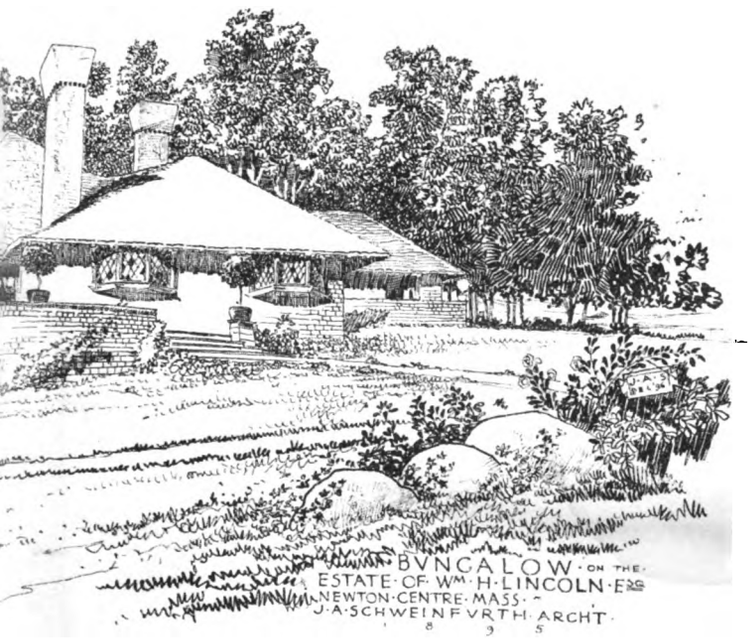


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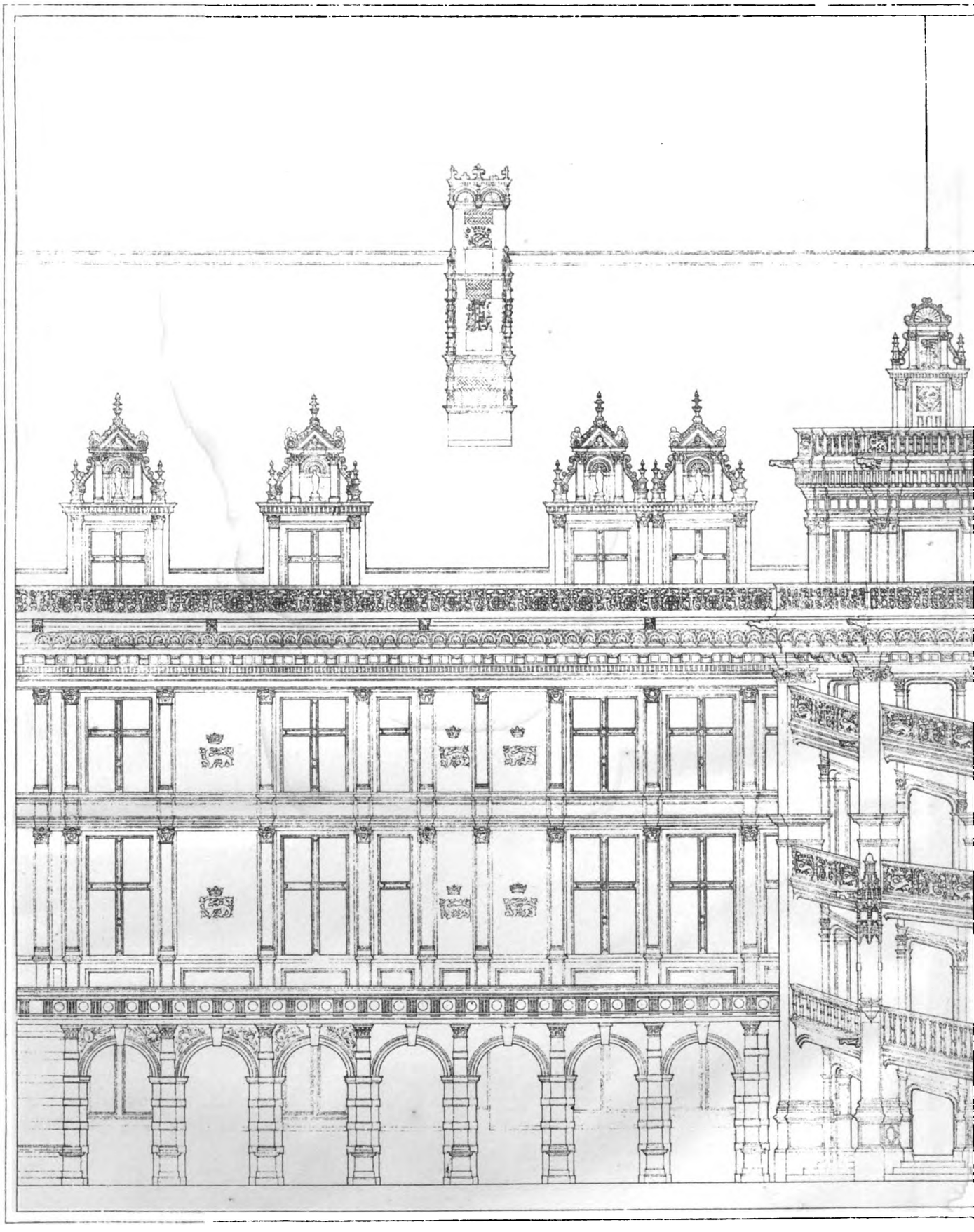


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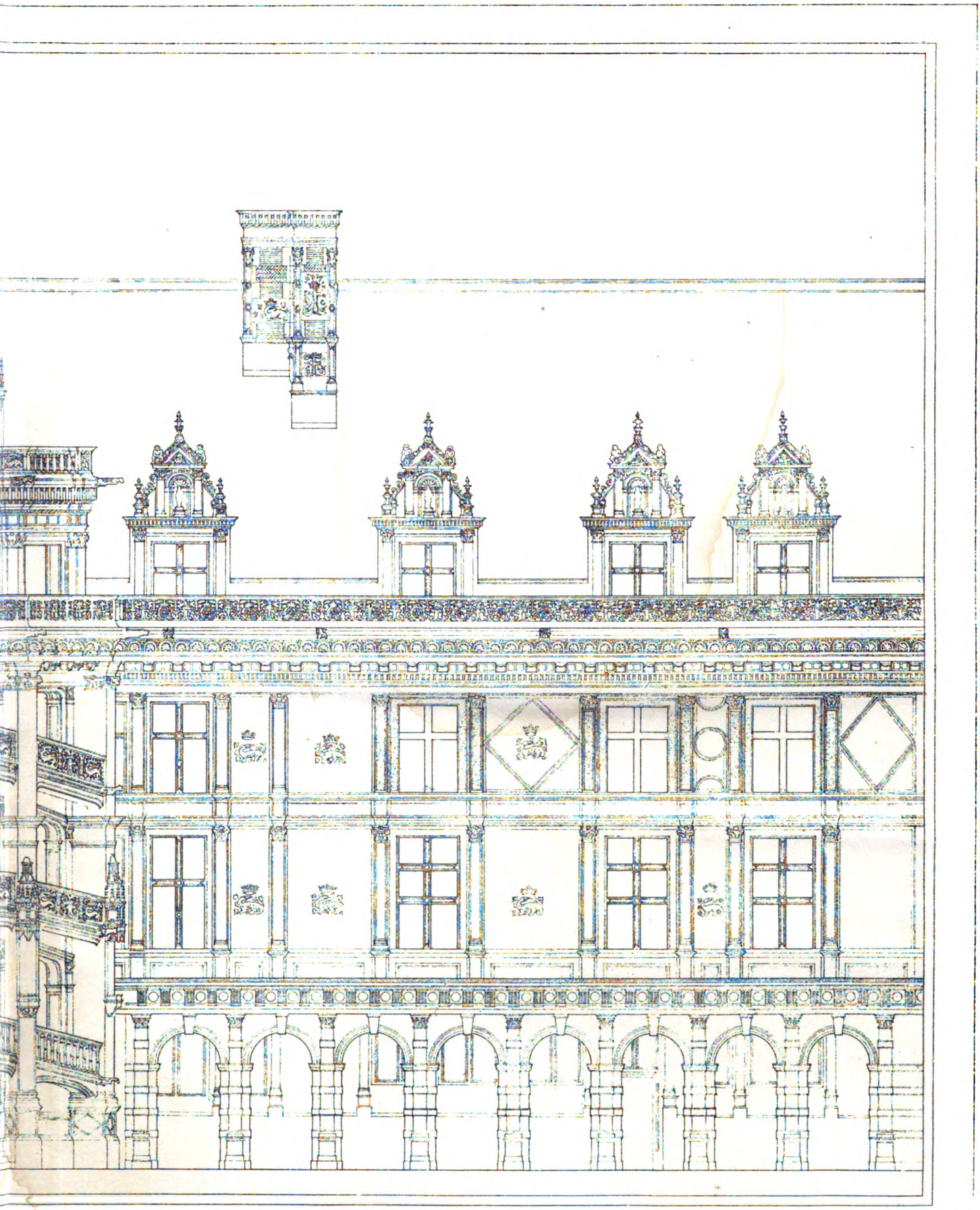


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Measured and Drawn by W. J. Partridge 1890-92. Scale .01=1.00

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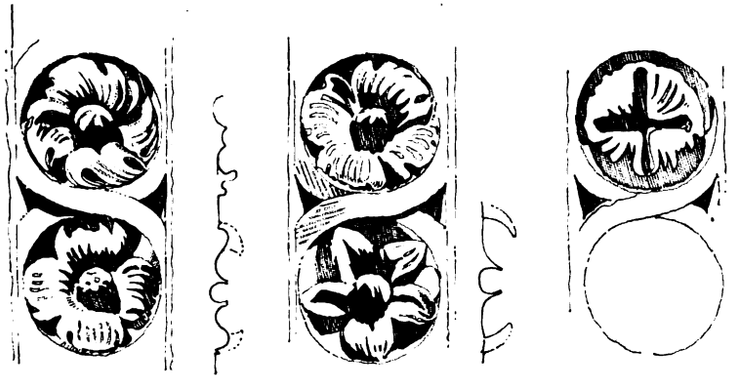
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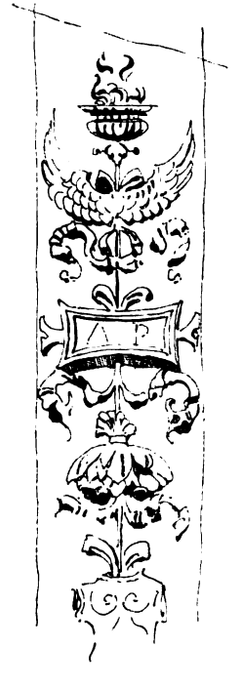
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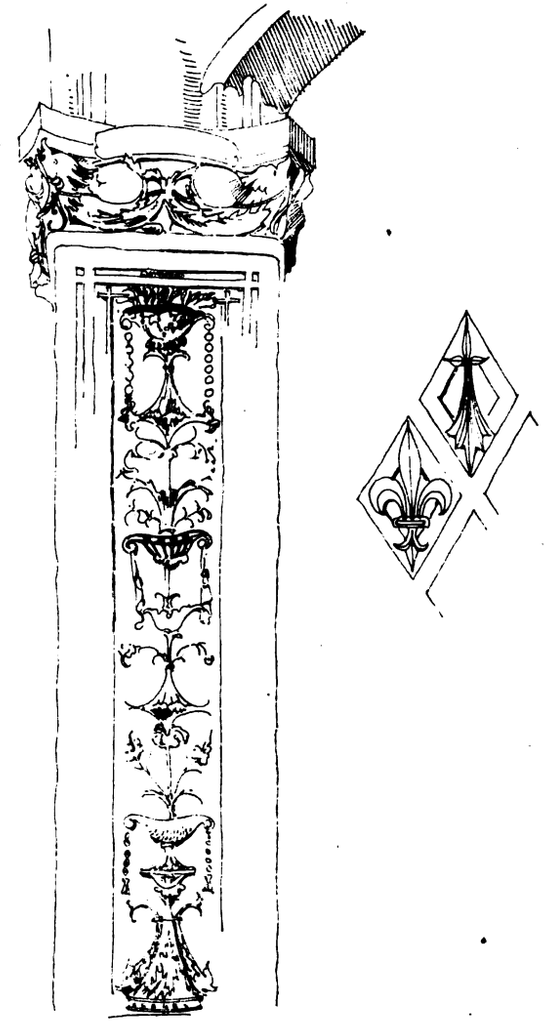
DETAIL FROM STAIRCASE [TROCADERO]



FROM STAIRCASE



FROM STAIRCASE



FROM FACADE OF LOUIS XII

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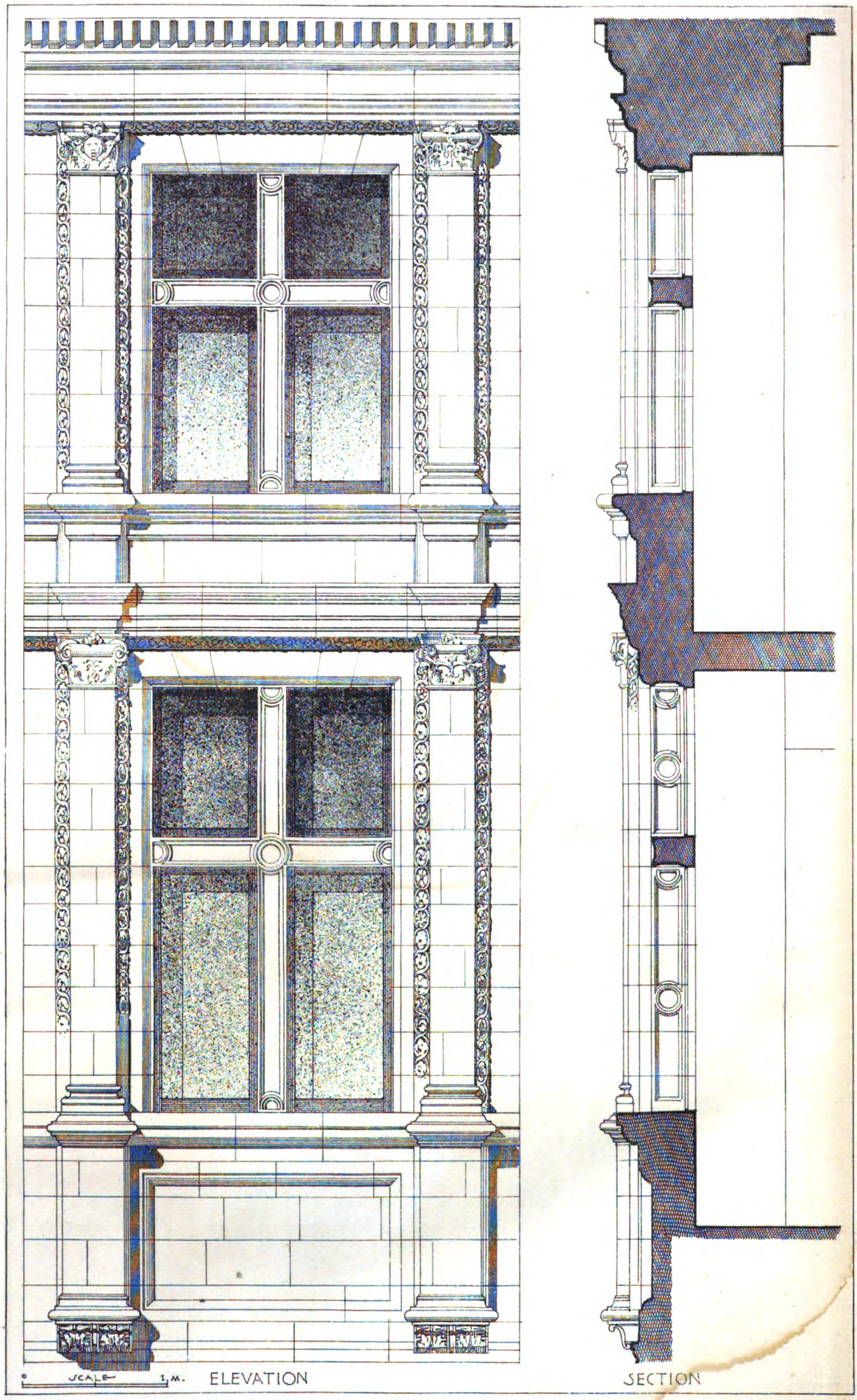
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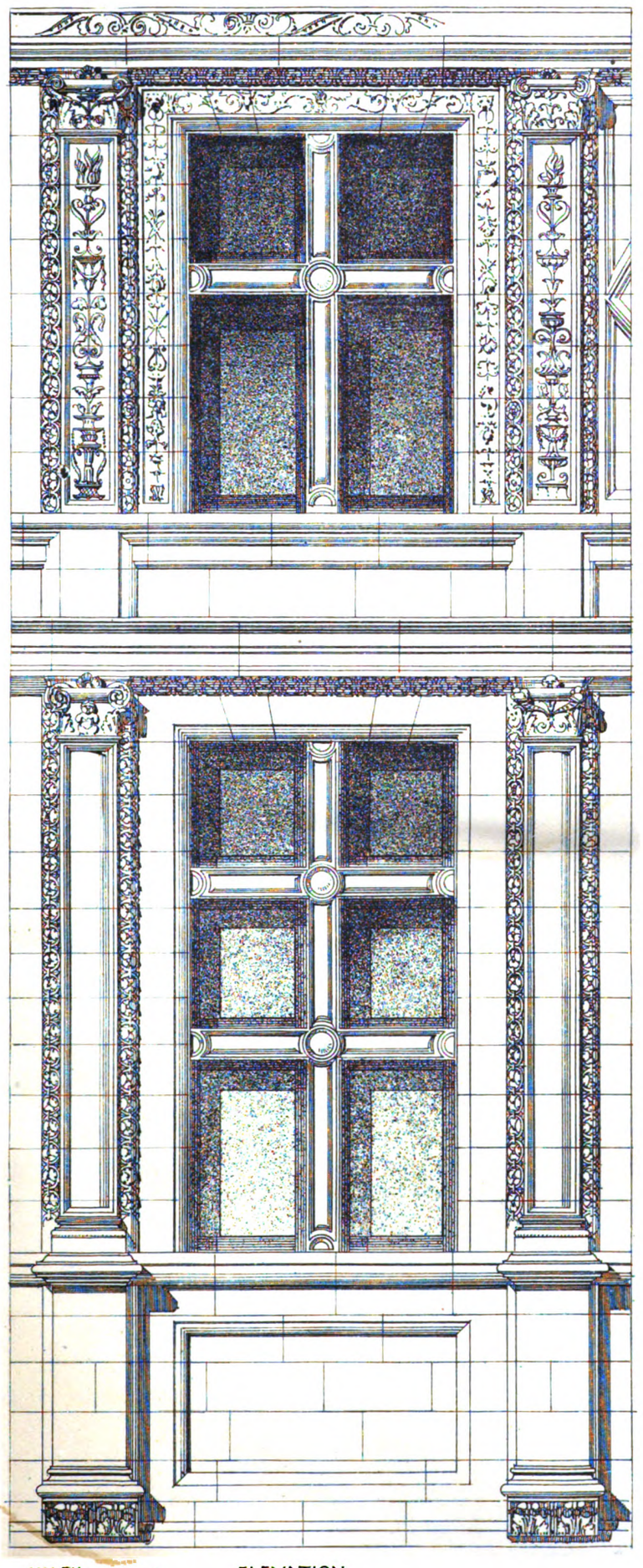


DETAIL OF COURT FACADE ADJOINING GRAND STAIRCASE

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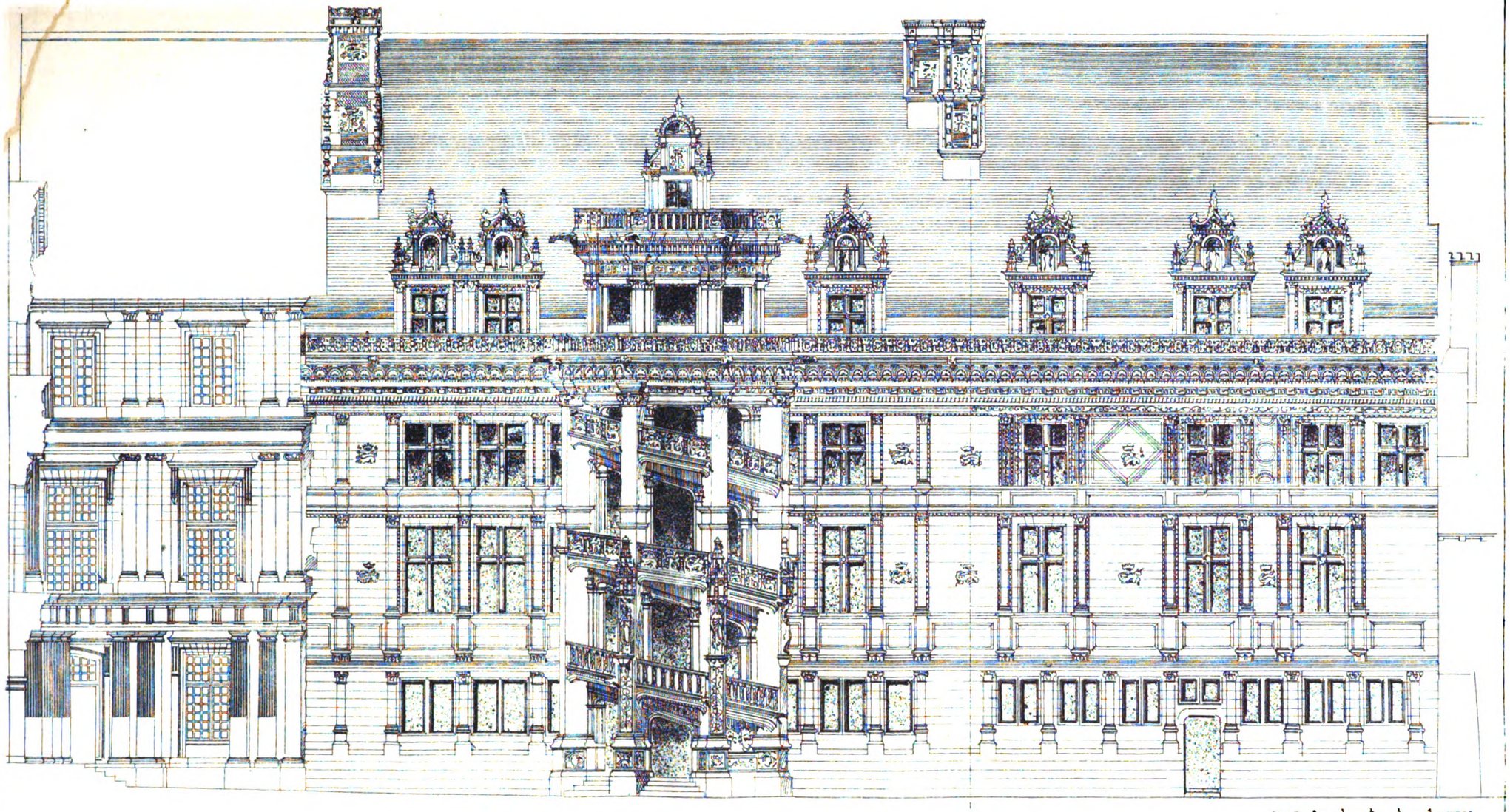
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DETAIL OF COURT FACADE TO THE RIGHT OF GRAND STAIRCASE

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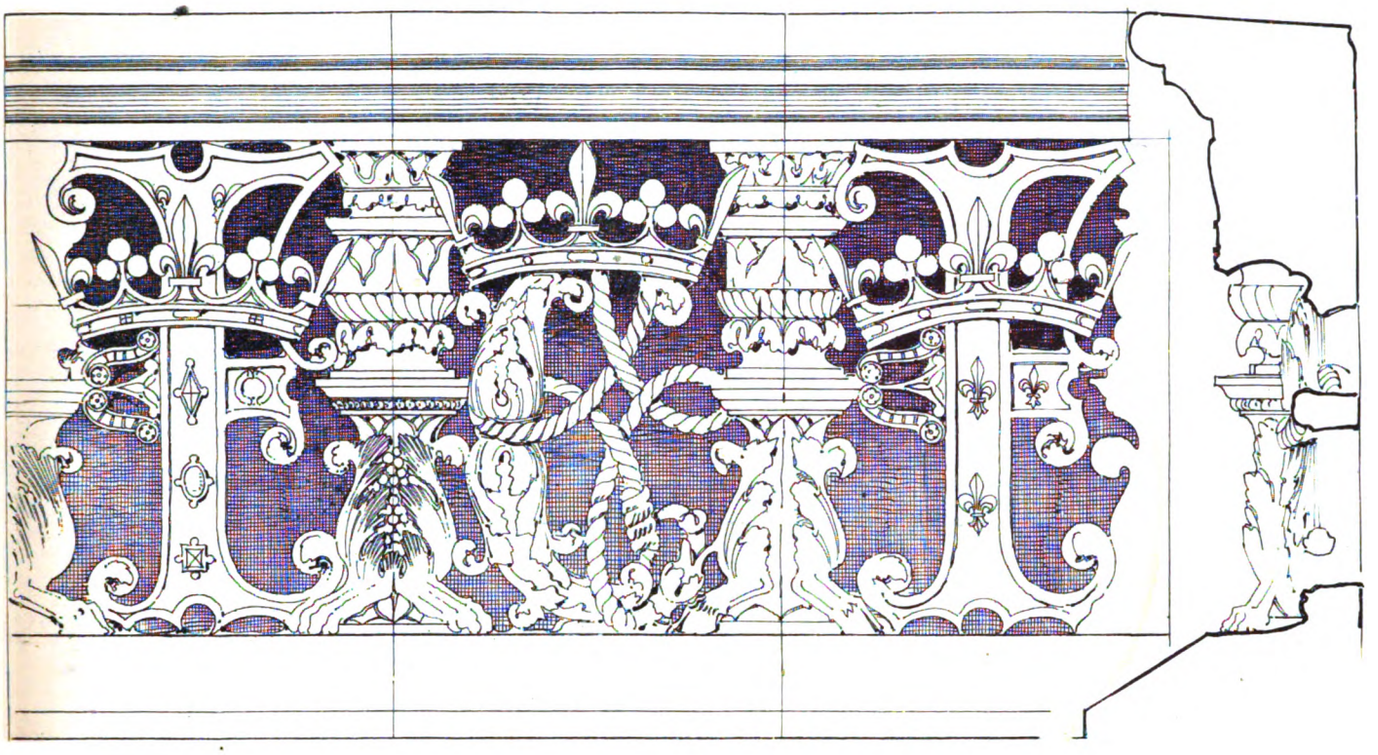
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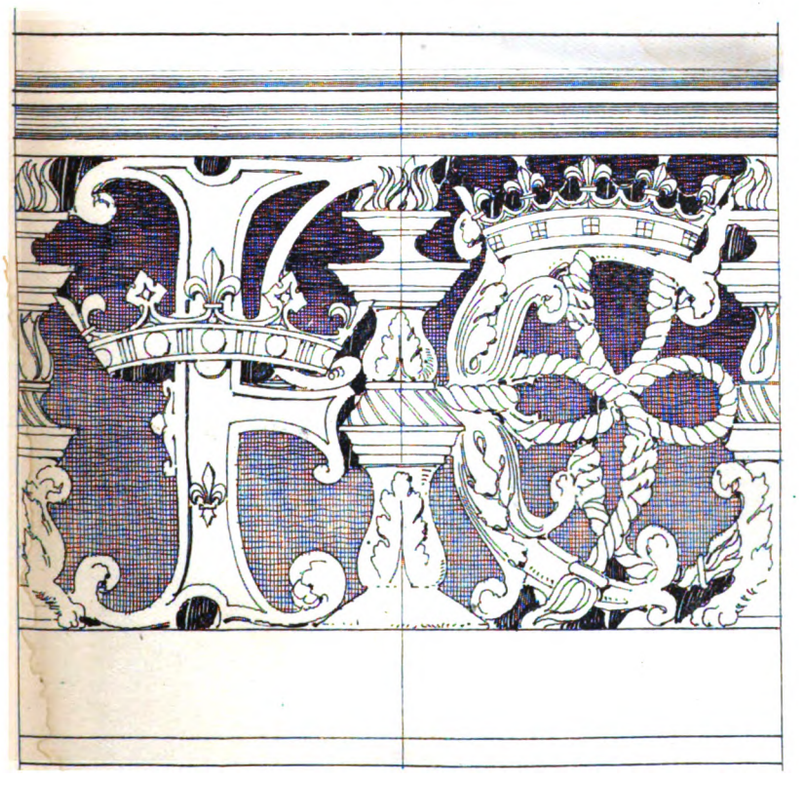


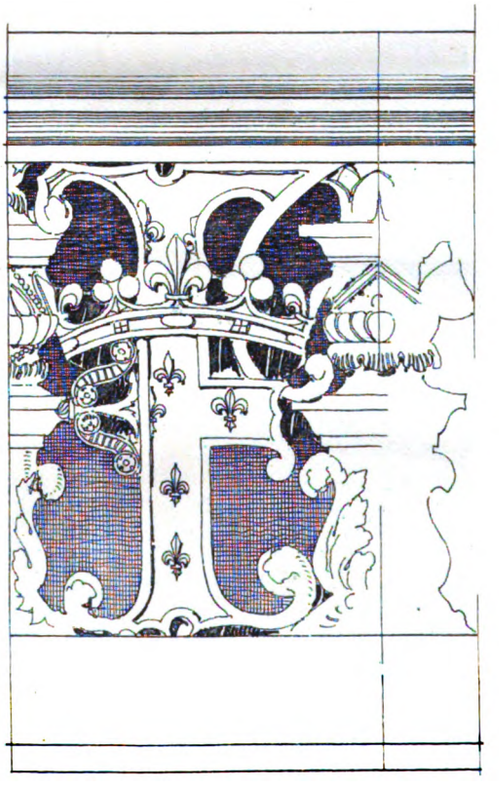
BALUSTRADE AS RESTORED

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- COURT FACADE FRANCIS I -





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1 ORIGINAL DESIGN

2 ORIGINAL DESIGN

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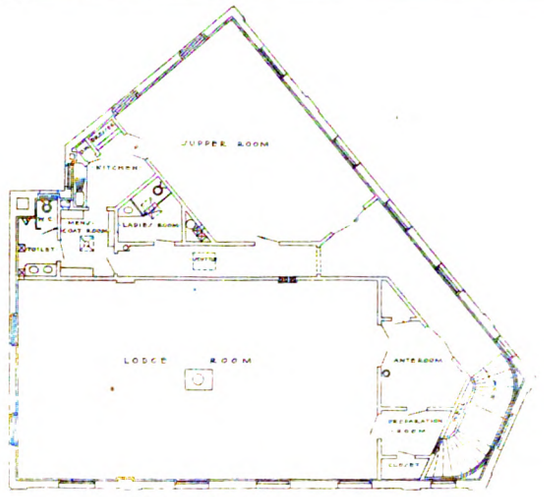
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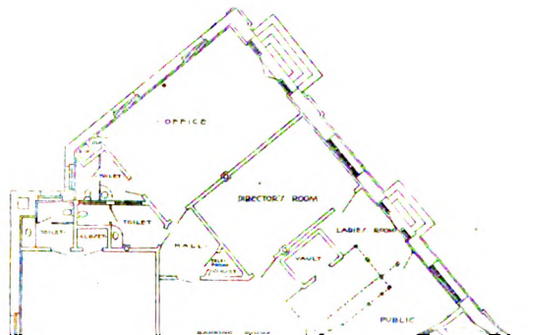




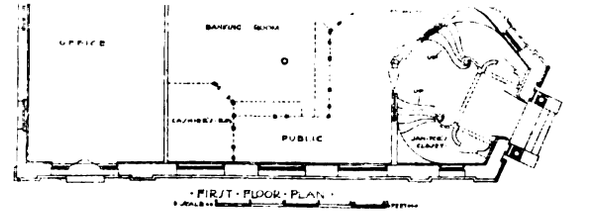
THIRD FLOOR PLAN

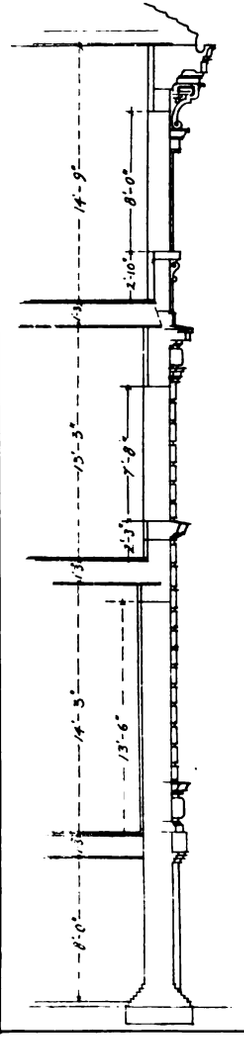


SECOND FLOOR PLAN

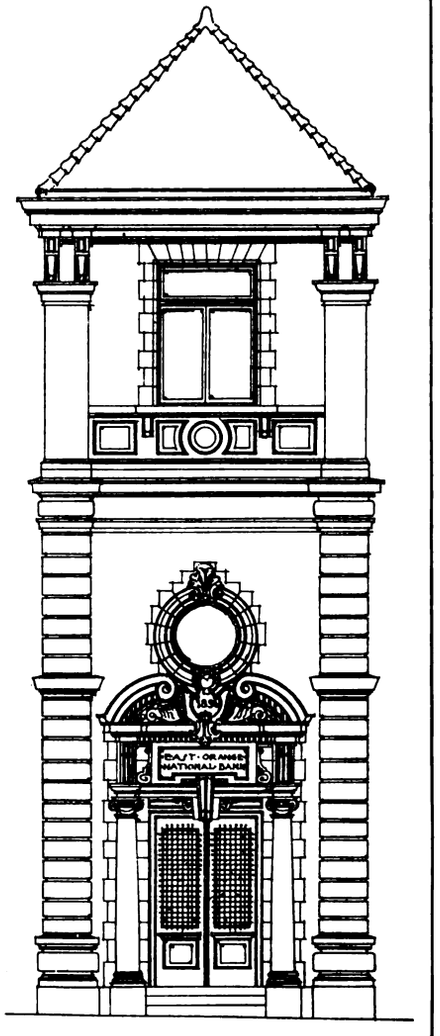


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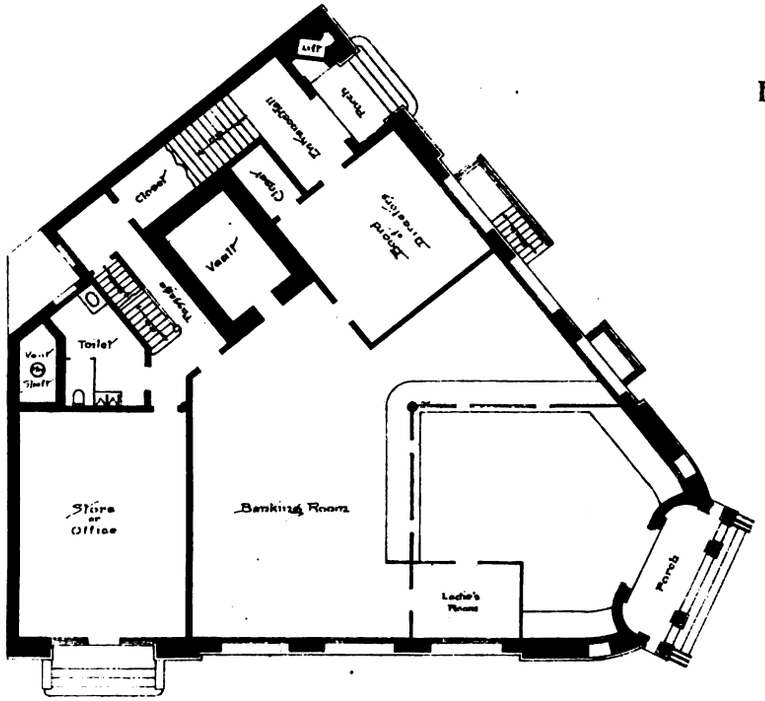
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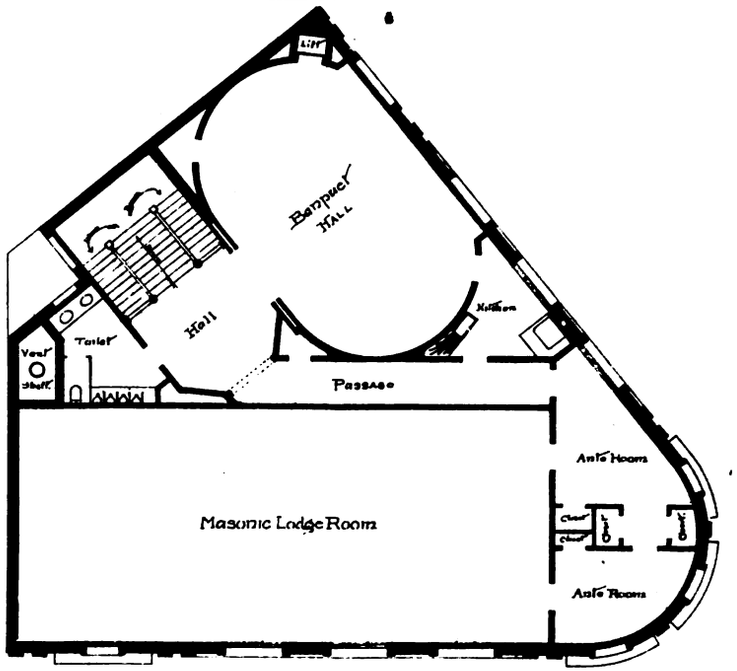
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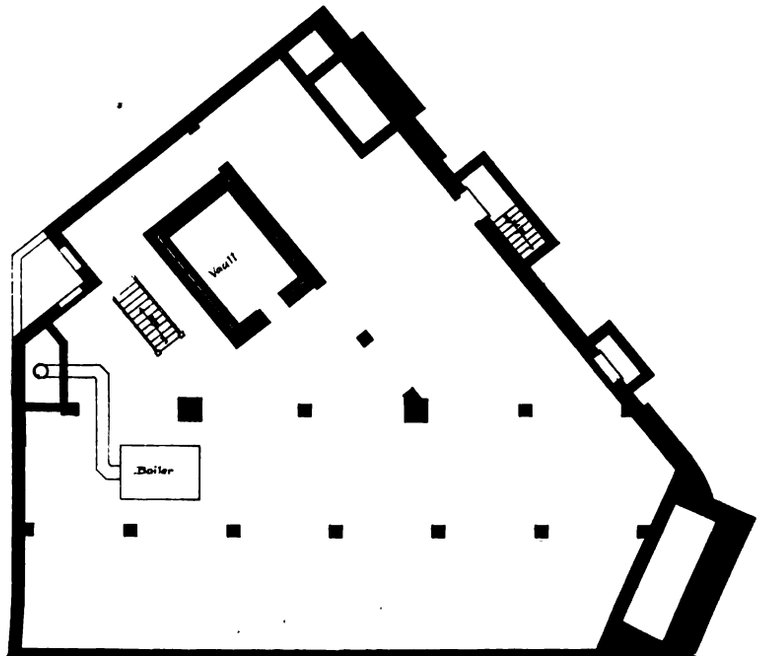
Richard H. Mosley
Architect.

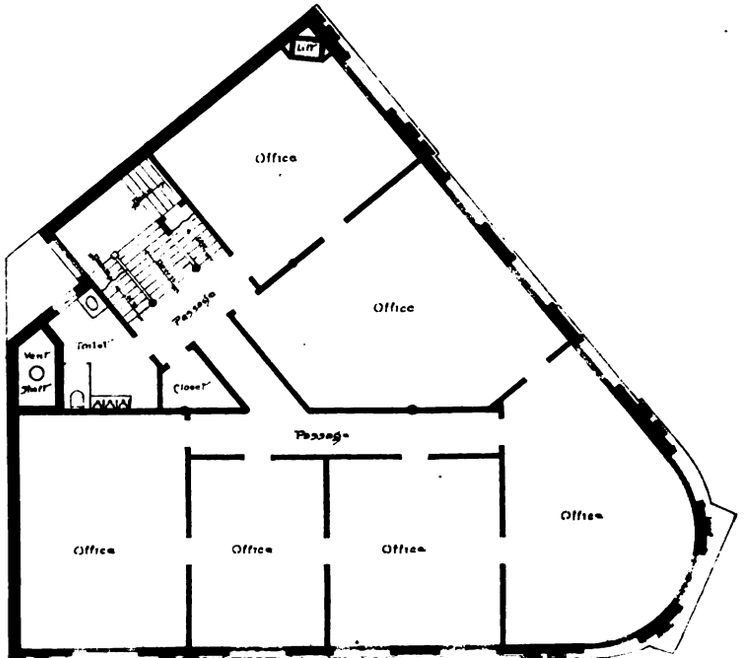


FIRST FLOOR PLAN



THIRD FLOOR PLAN

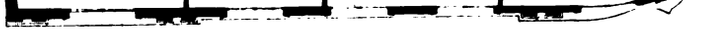




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CELLAR PLAN



SECOND FLOOR PLAN



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Proposed St Paul's Church.
Rochester. New Hampshire

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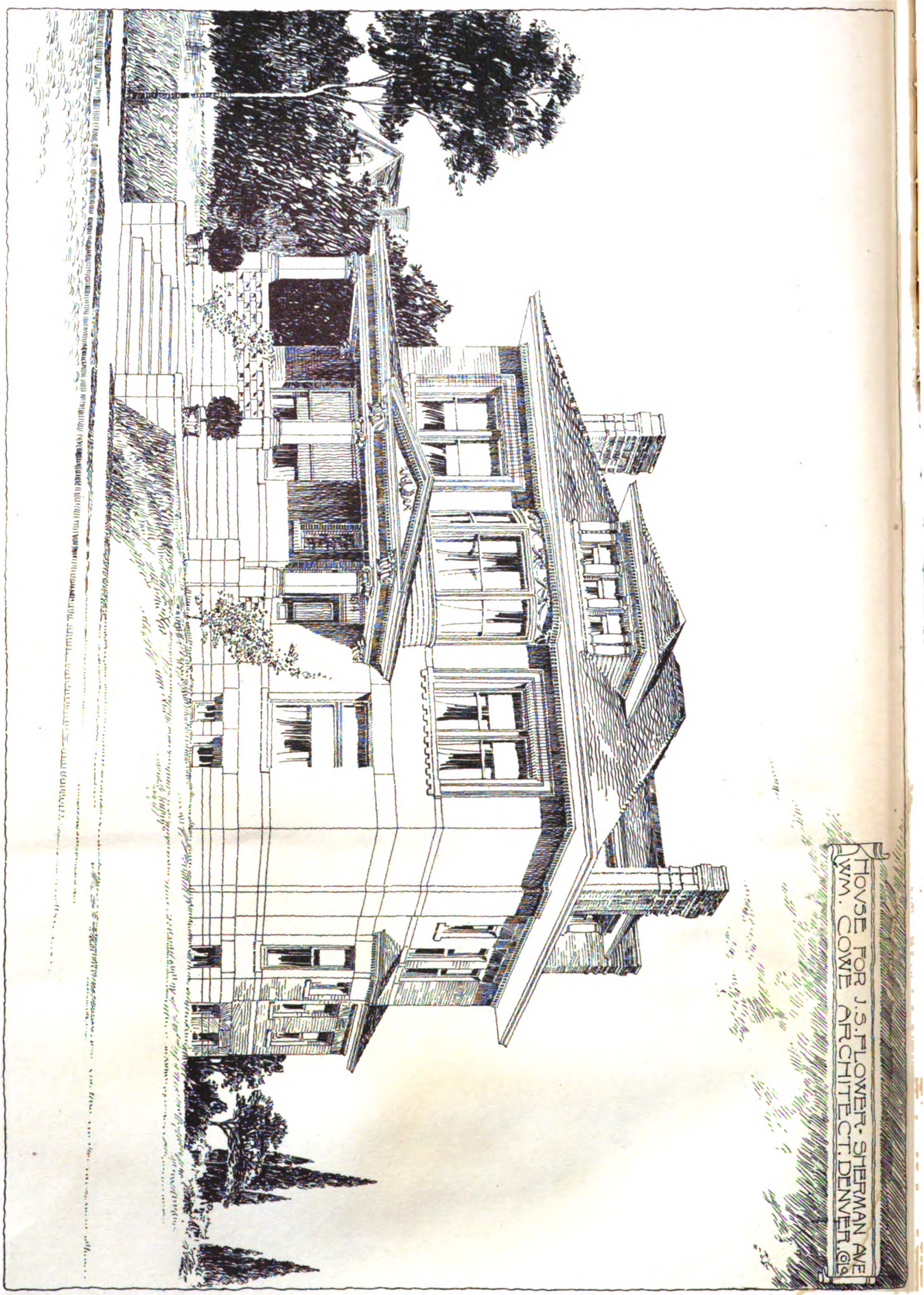
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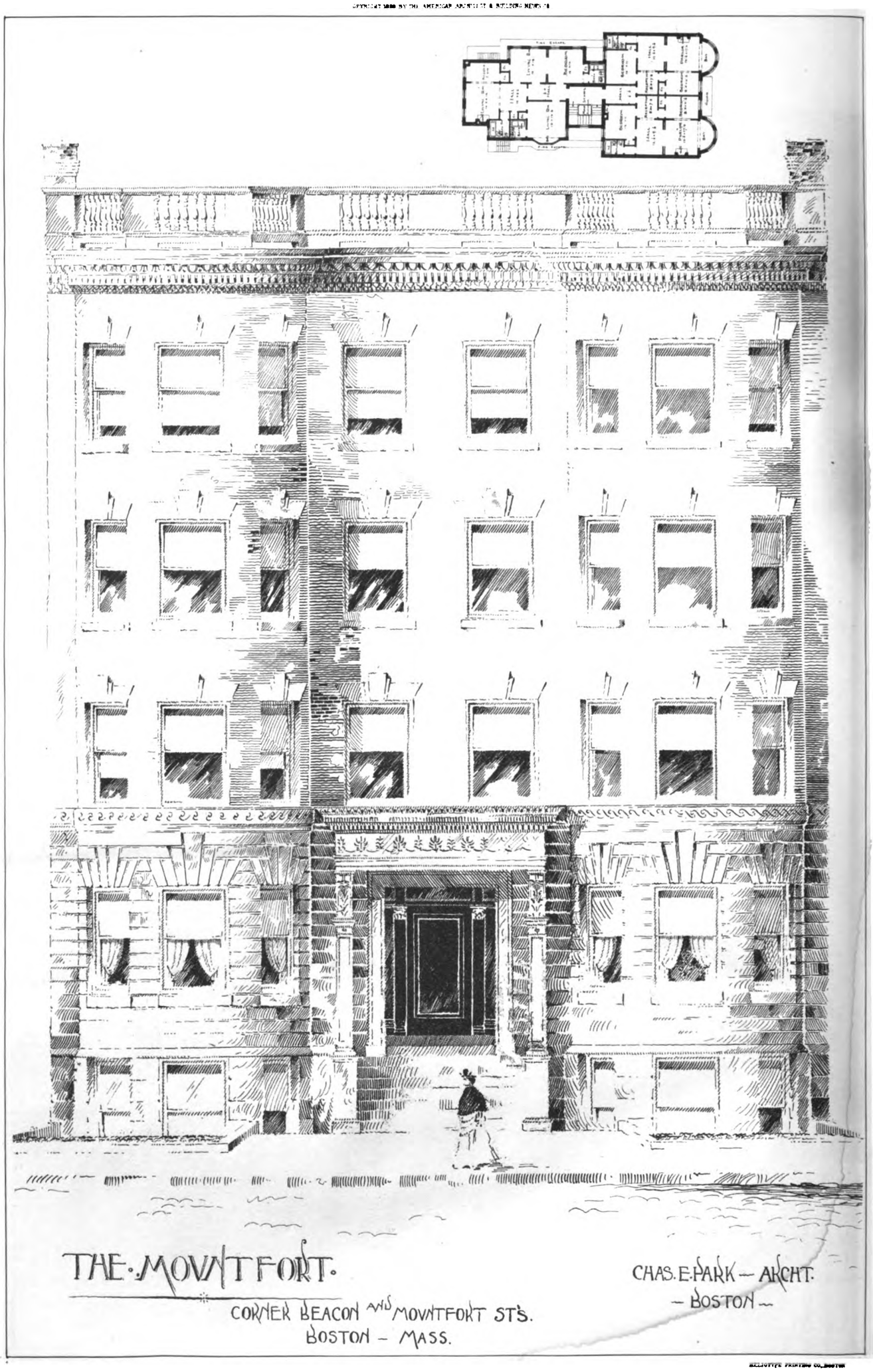


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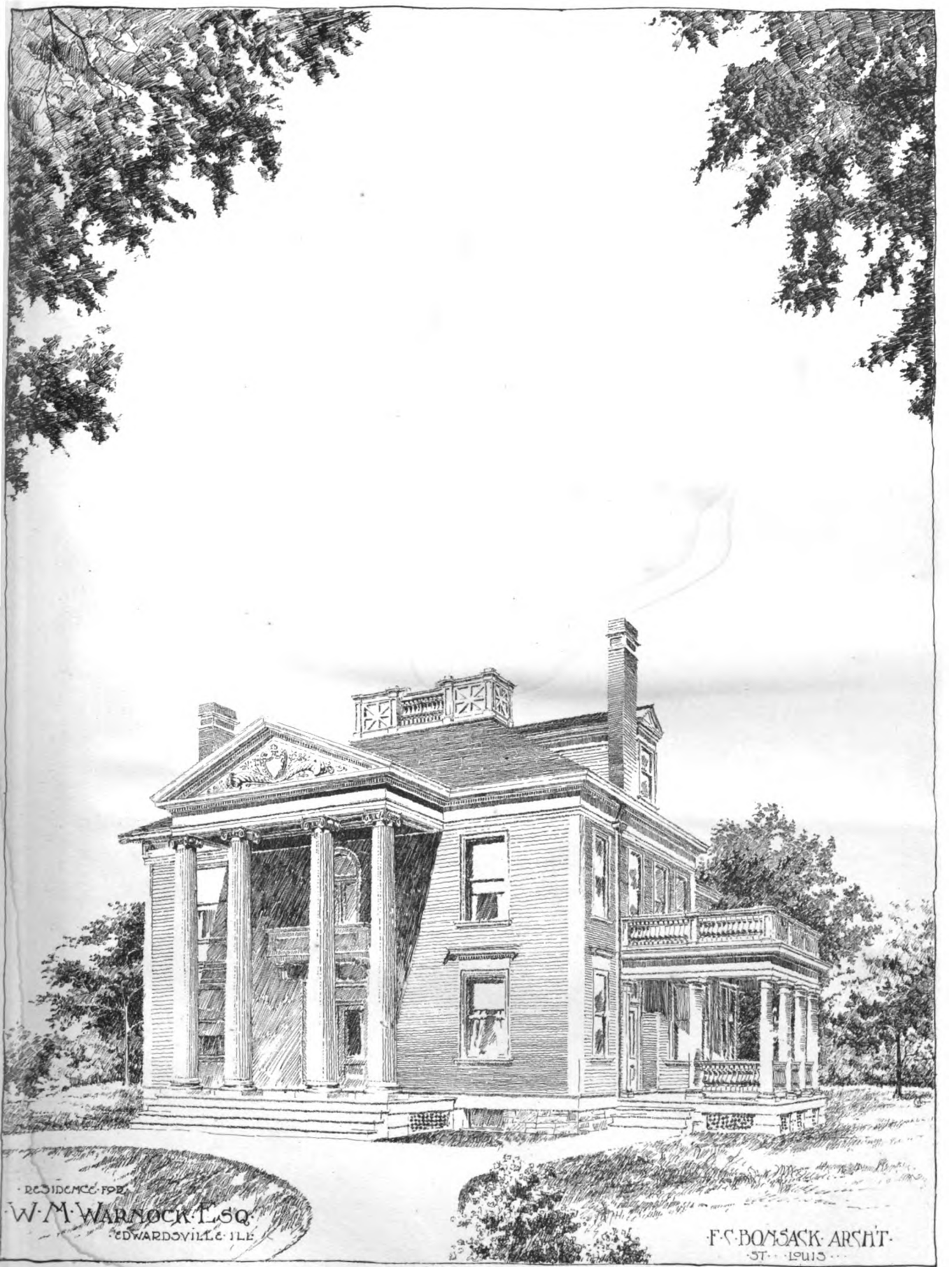
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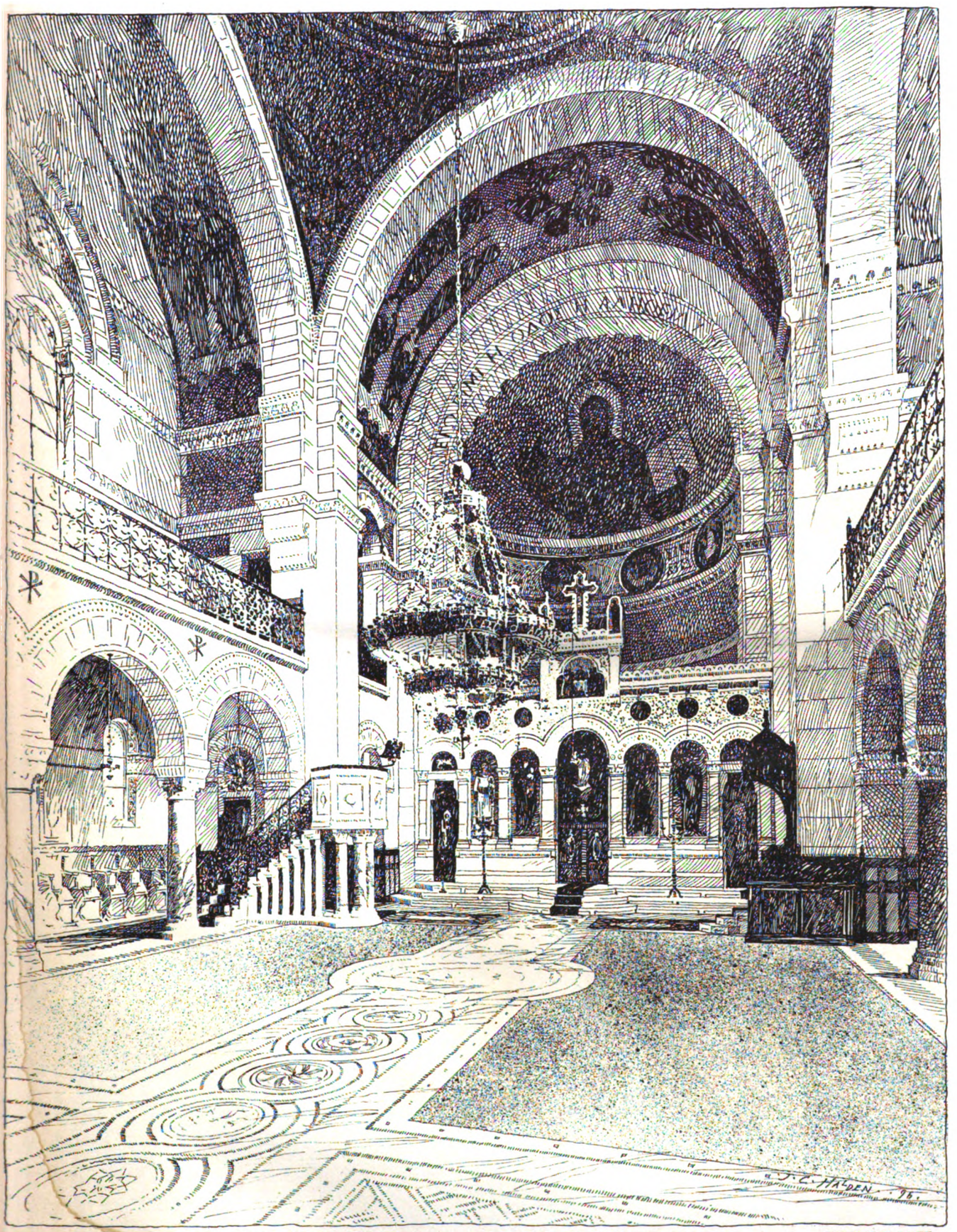
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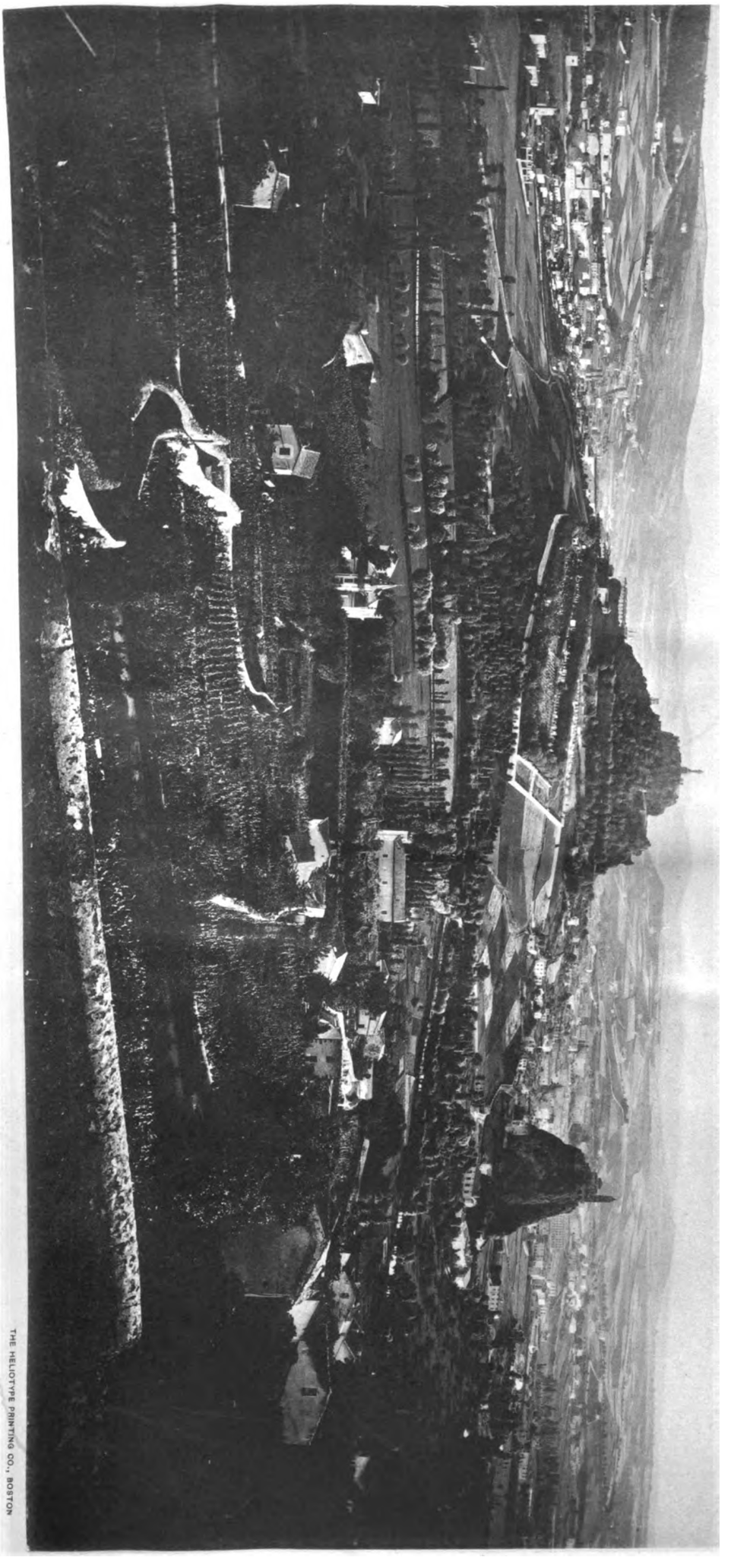
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LE PUY, HAUTE-LOIRE, FRANCE: FROM THE NORTH.

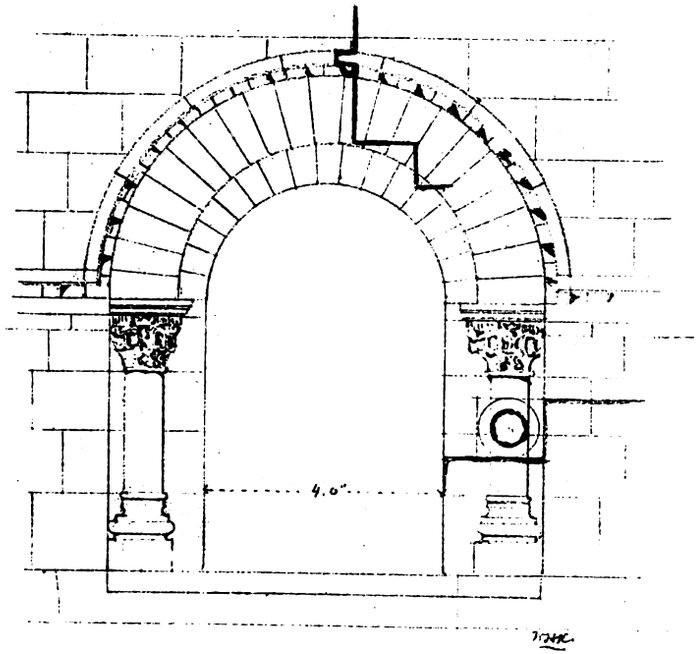
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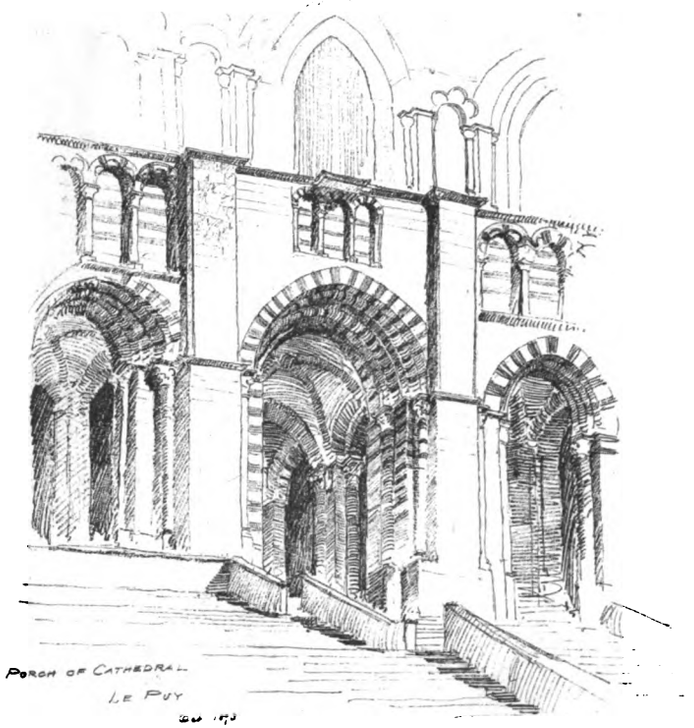
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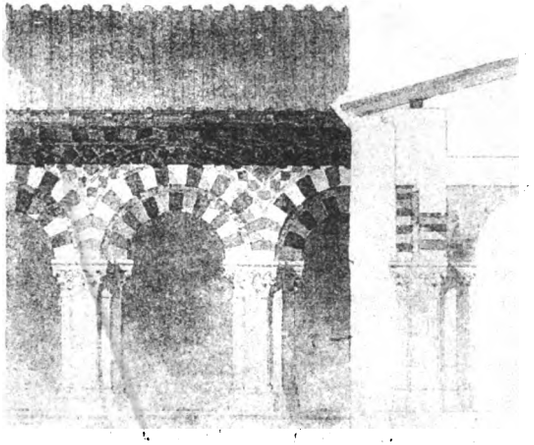
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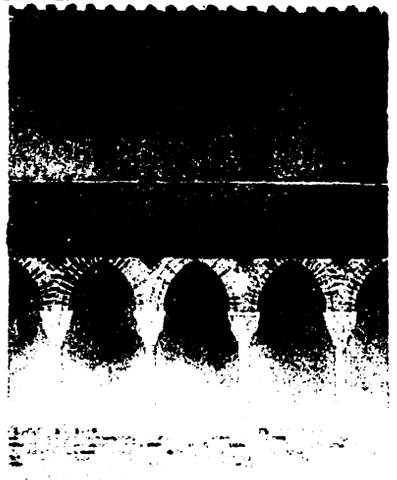


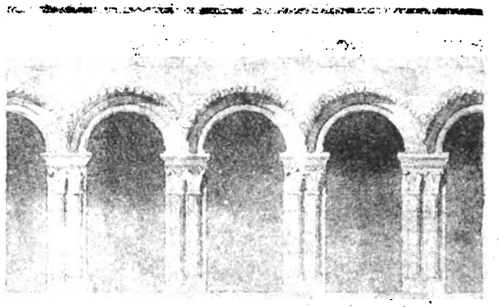
CLERESTORY WINDOW, LE PUY
Scale ½"=1 Foot



PORCH OF CATHEDRAL
LE PUY

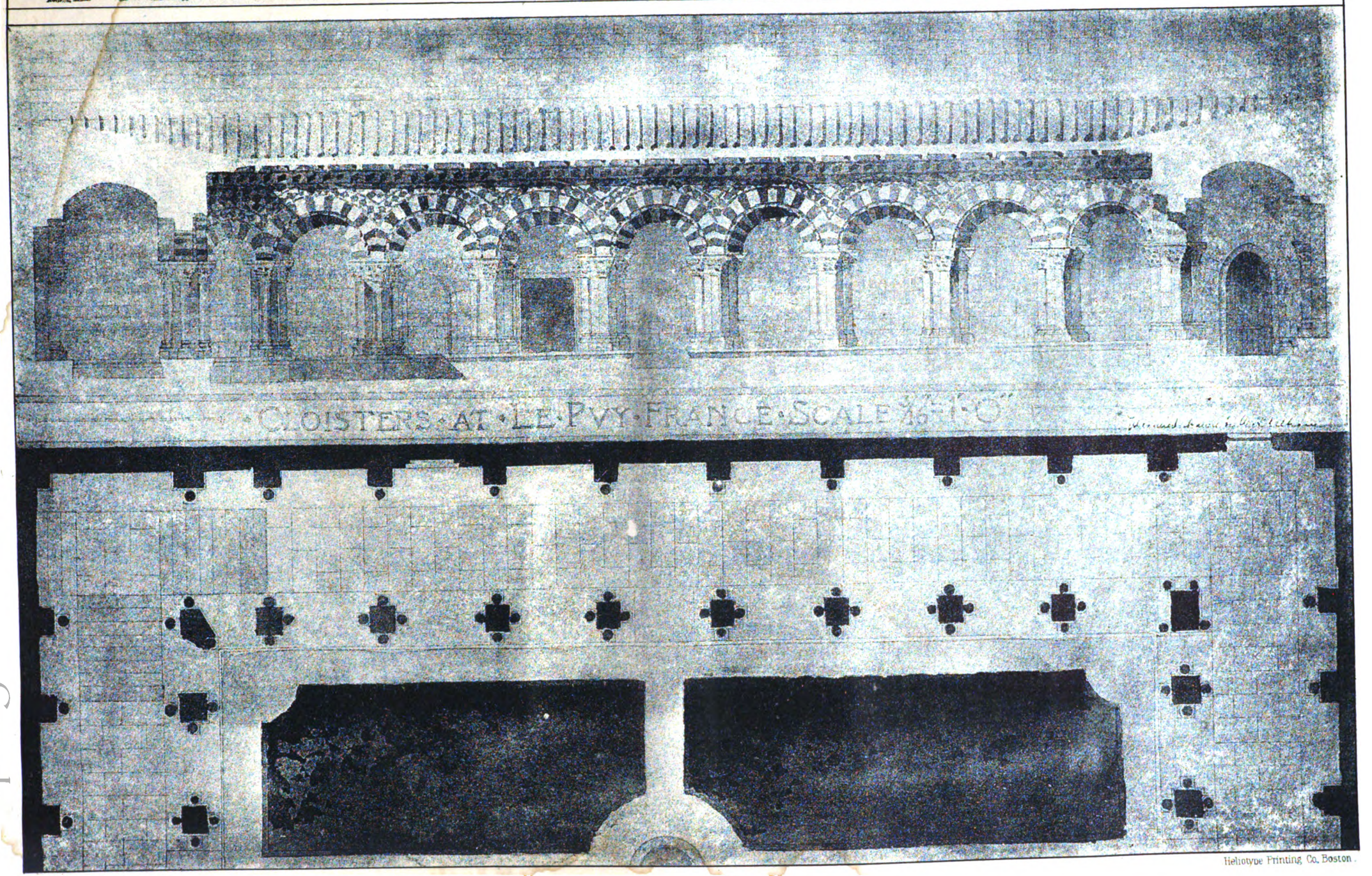






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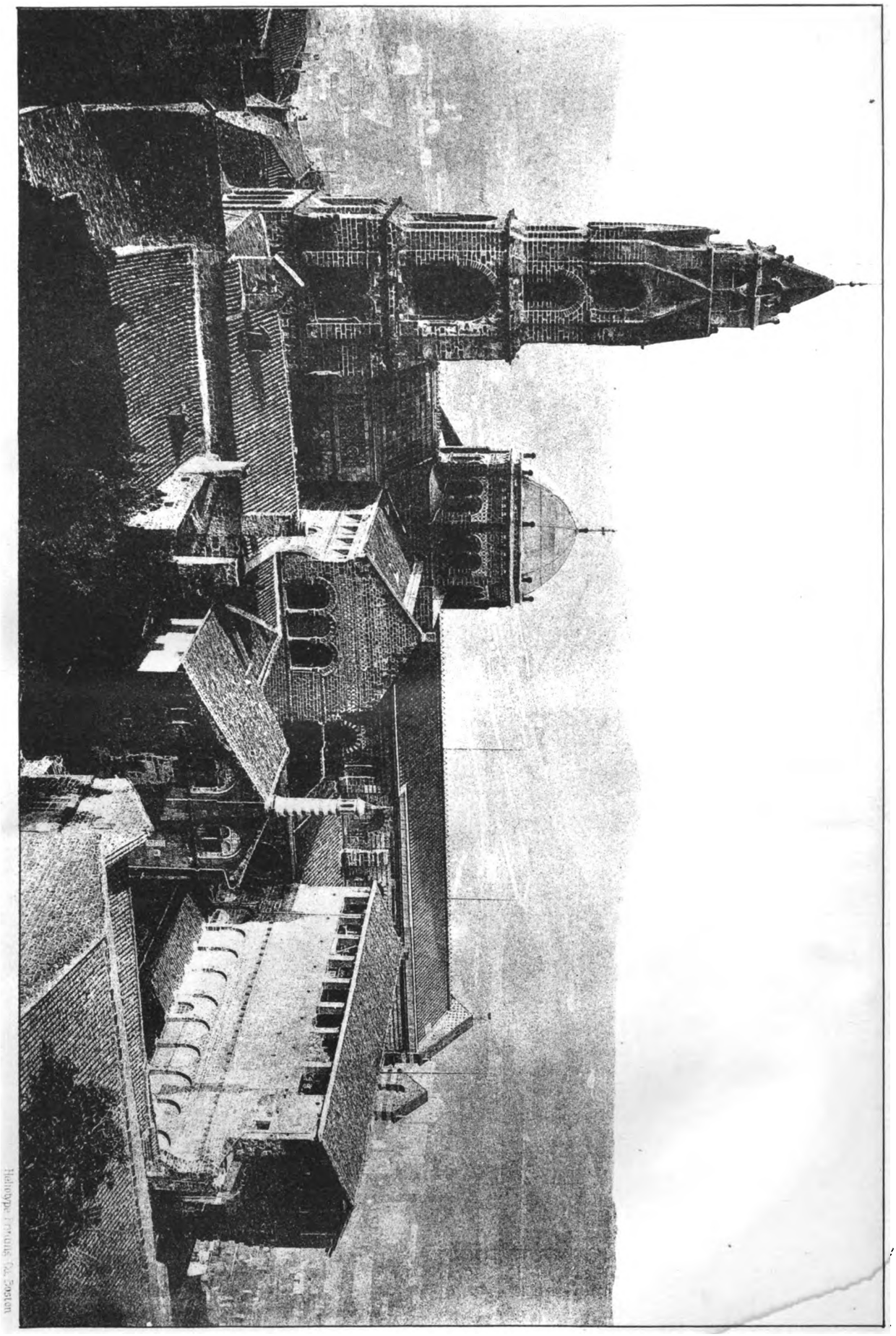


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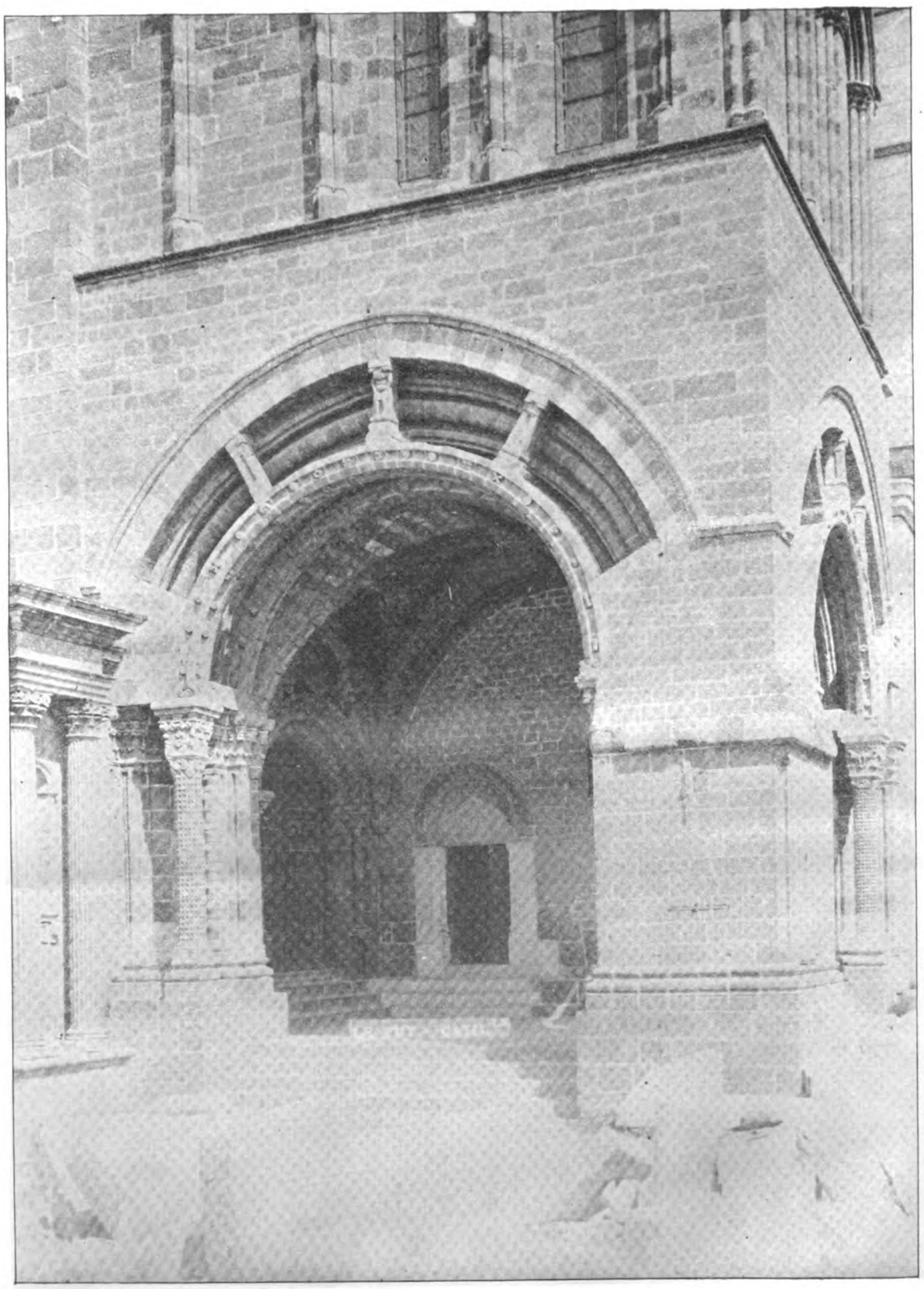


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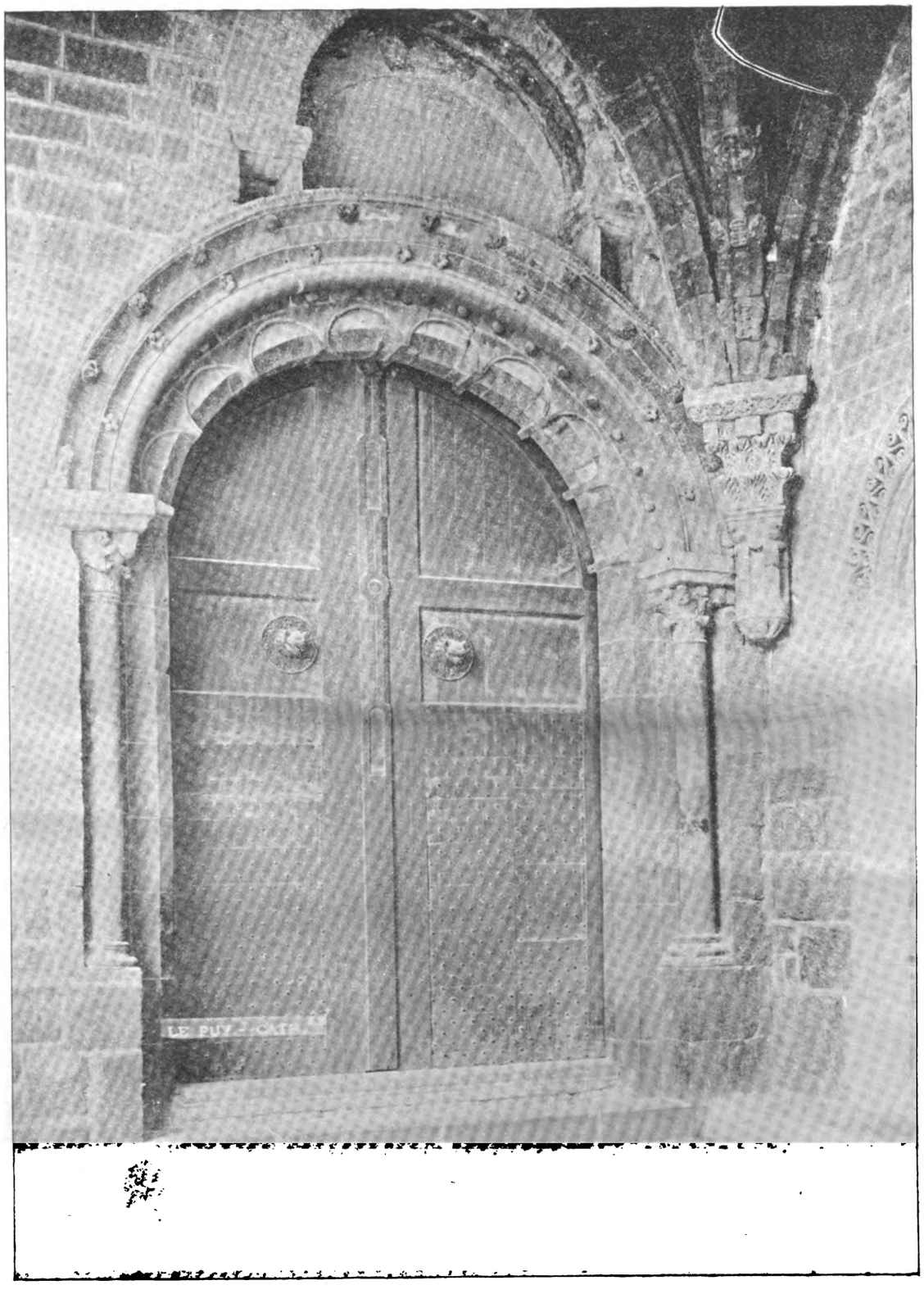
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South Transept Porch, Cathedral of Notre Dame,
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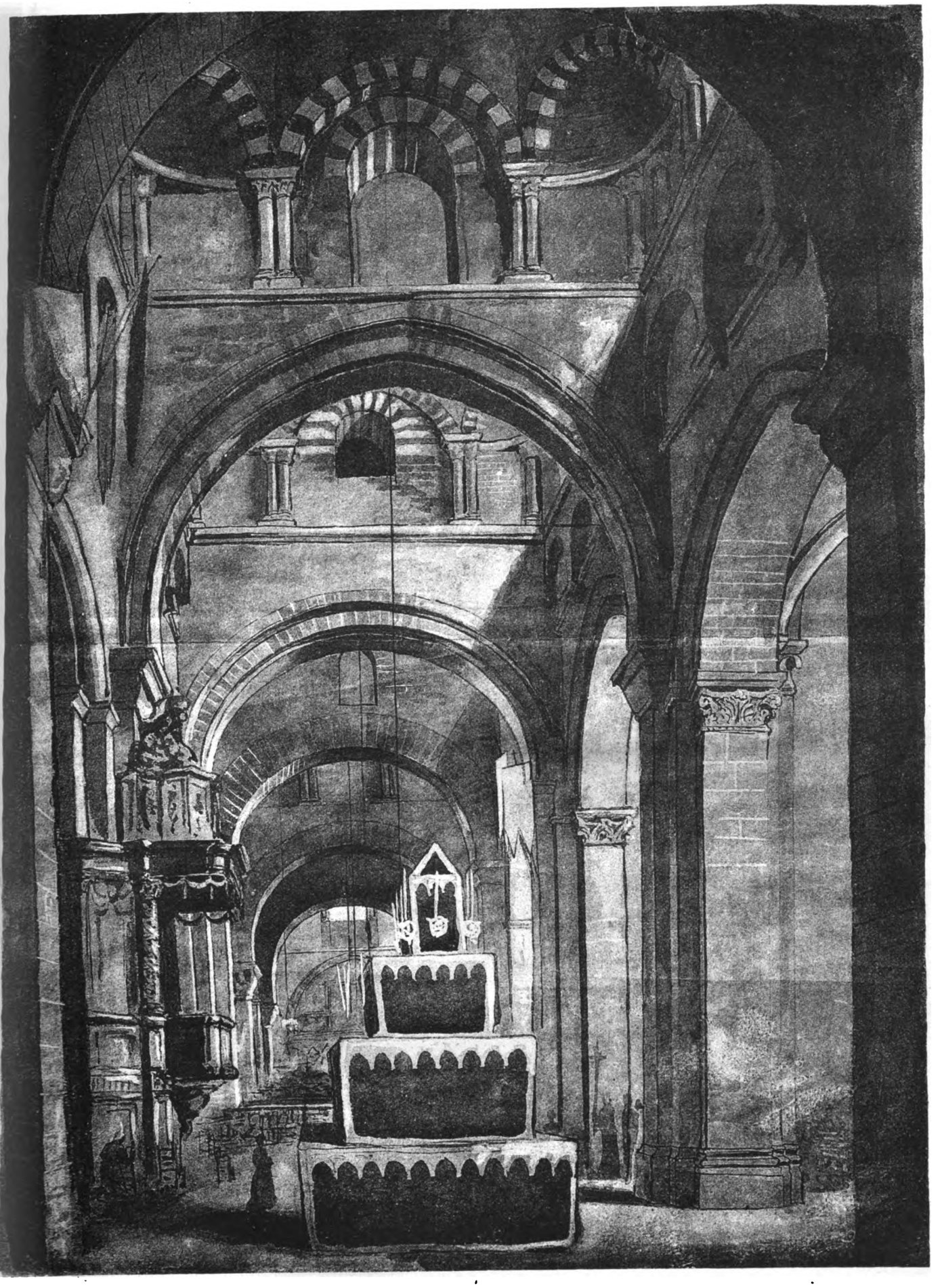


South Transept Door, Cathedral of Notre Dame,
Le Puy, Haute Loire, France.

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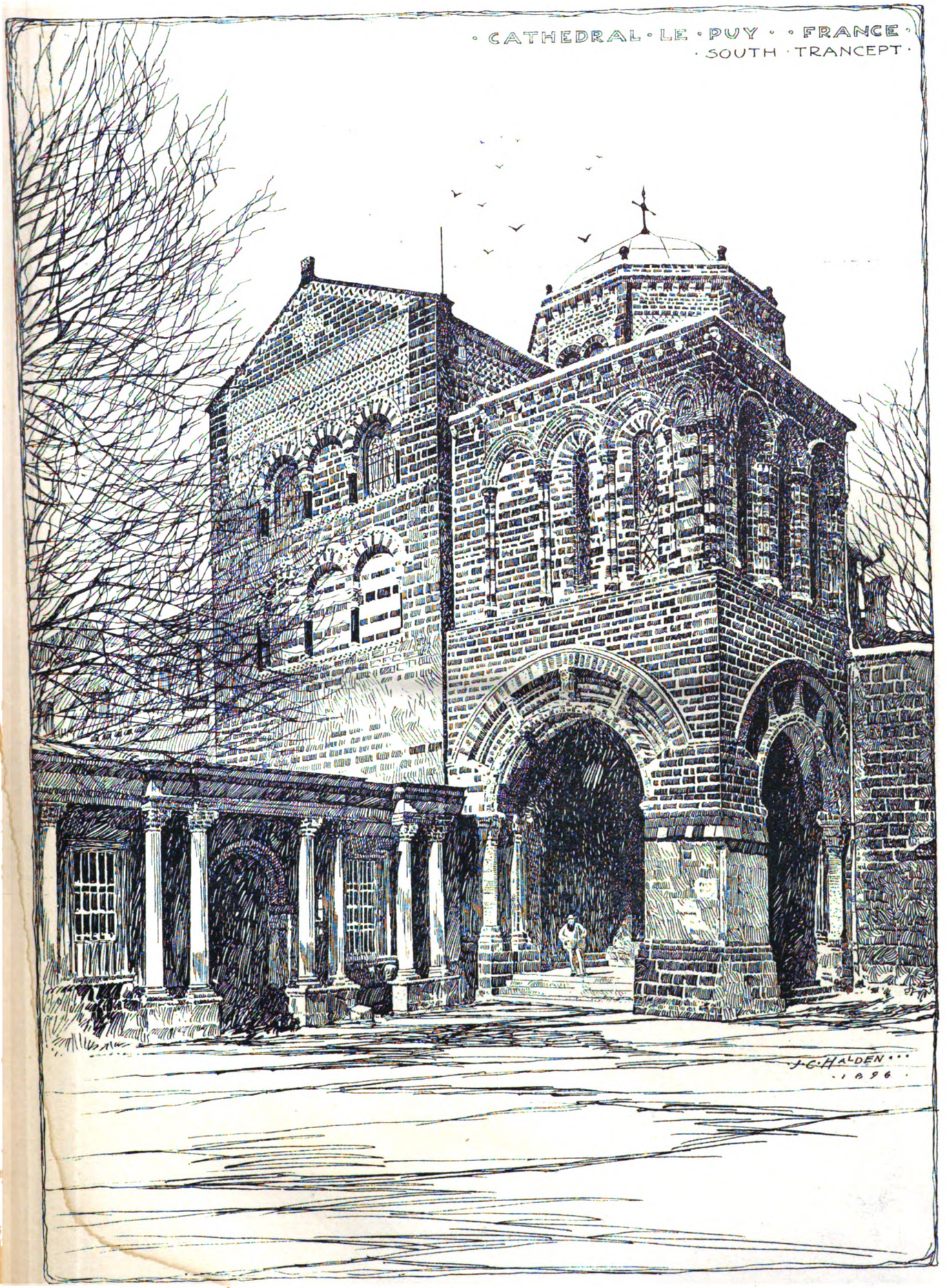
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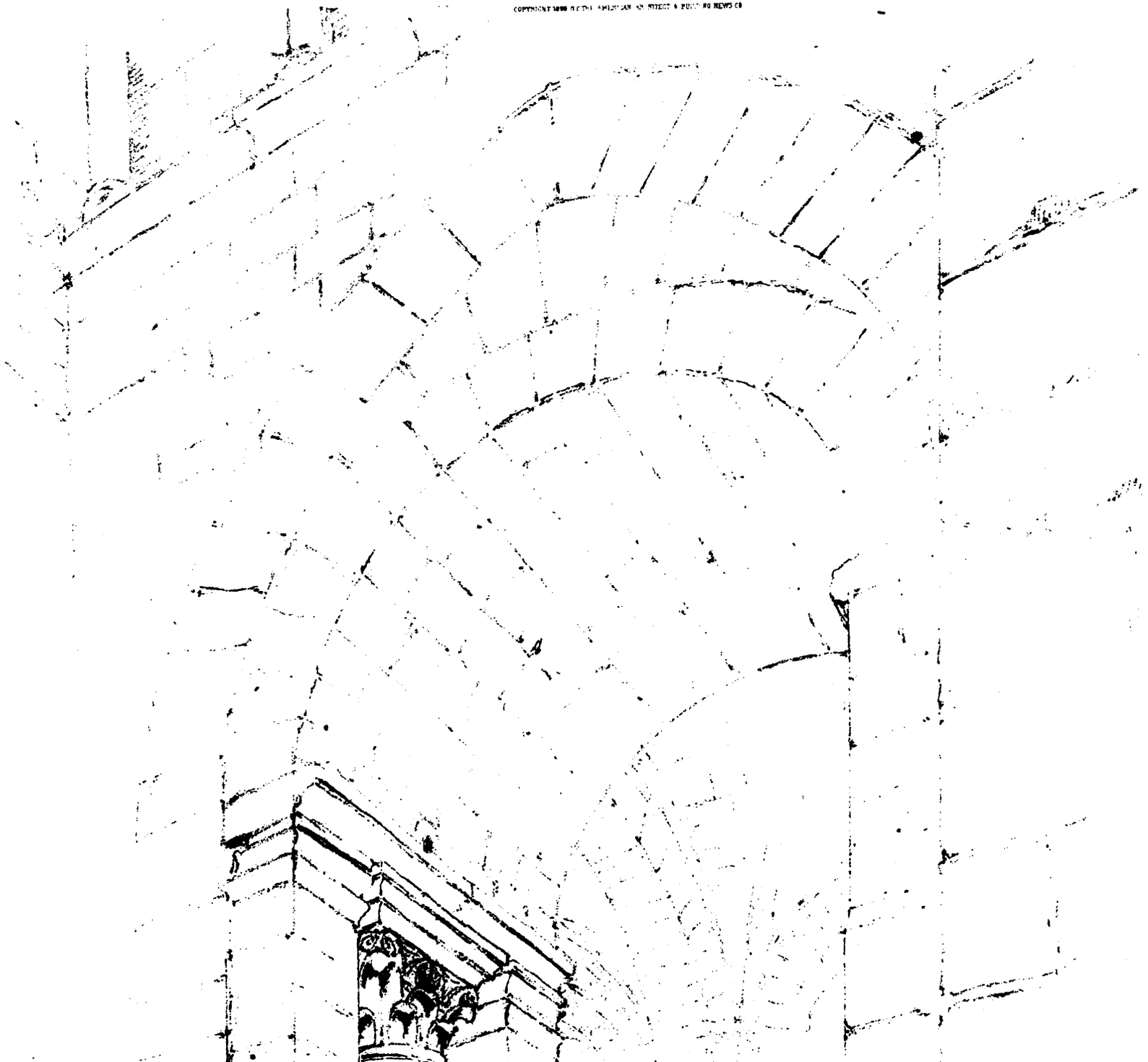


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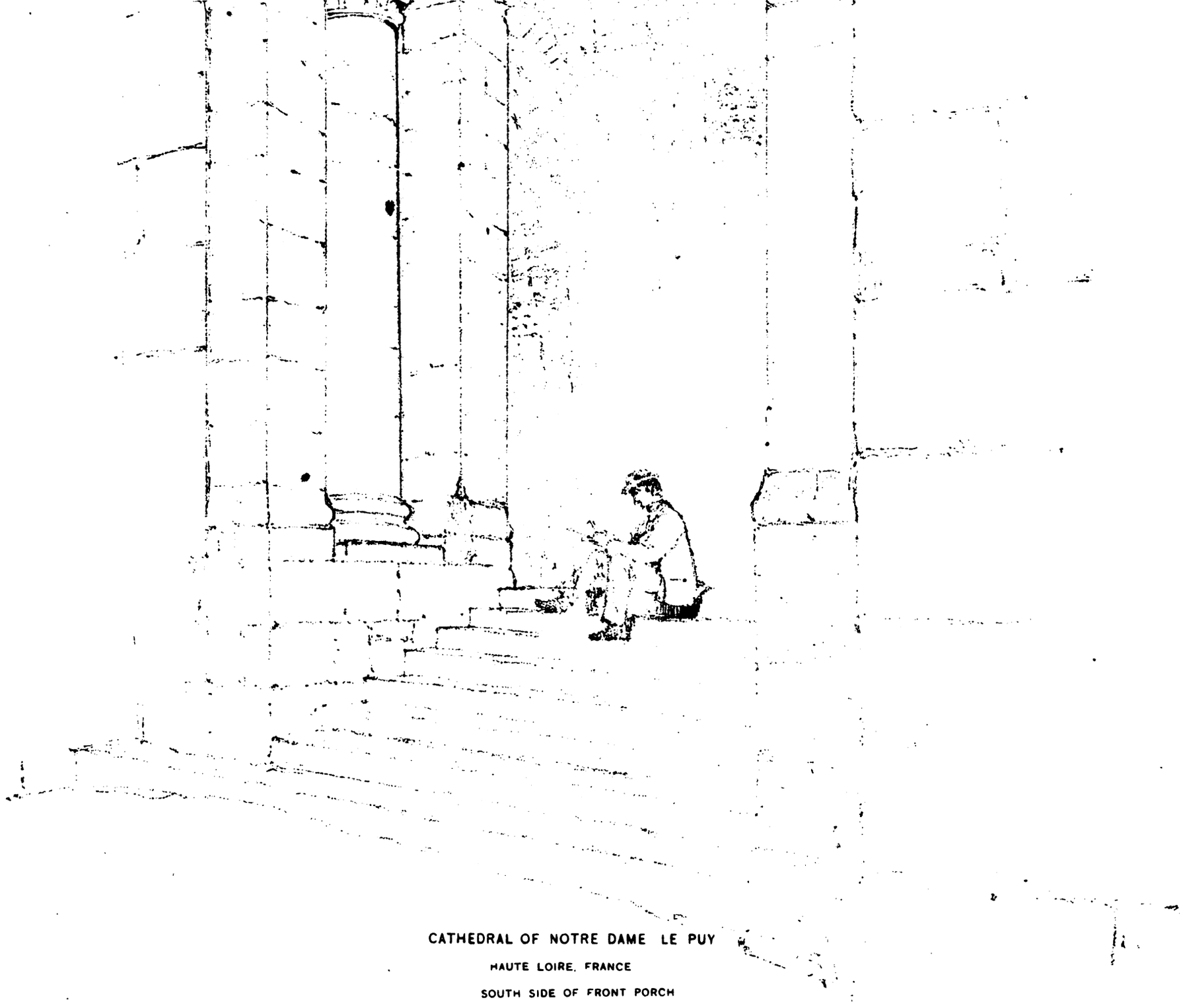
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SOUTH SIDE OF FRONT PORCH

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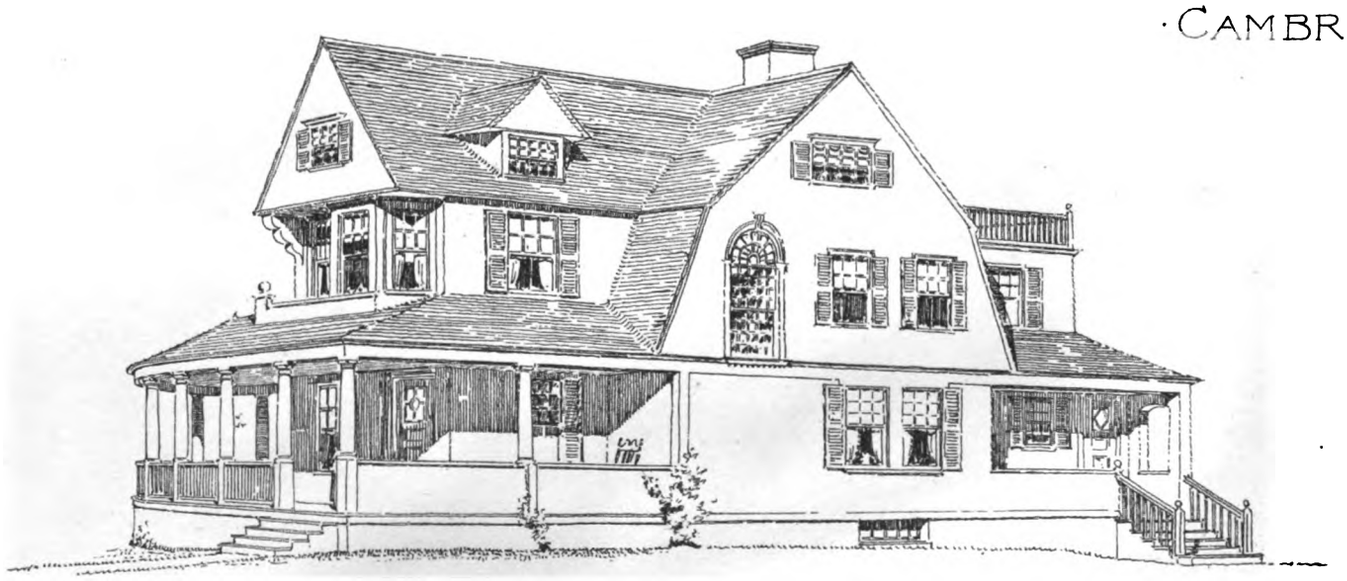
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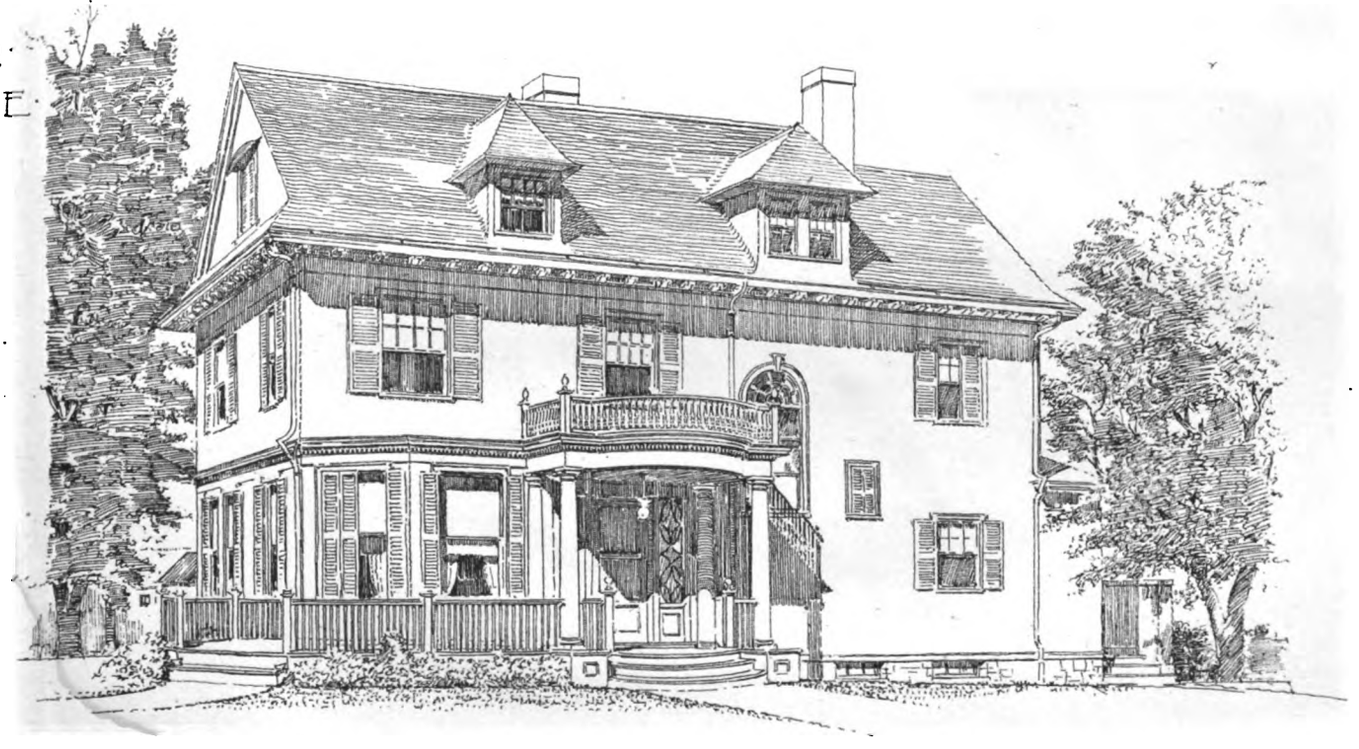
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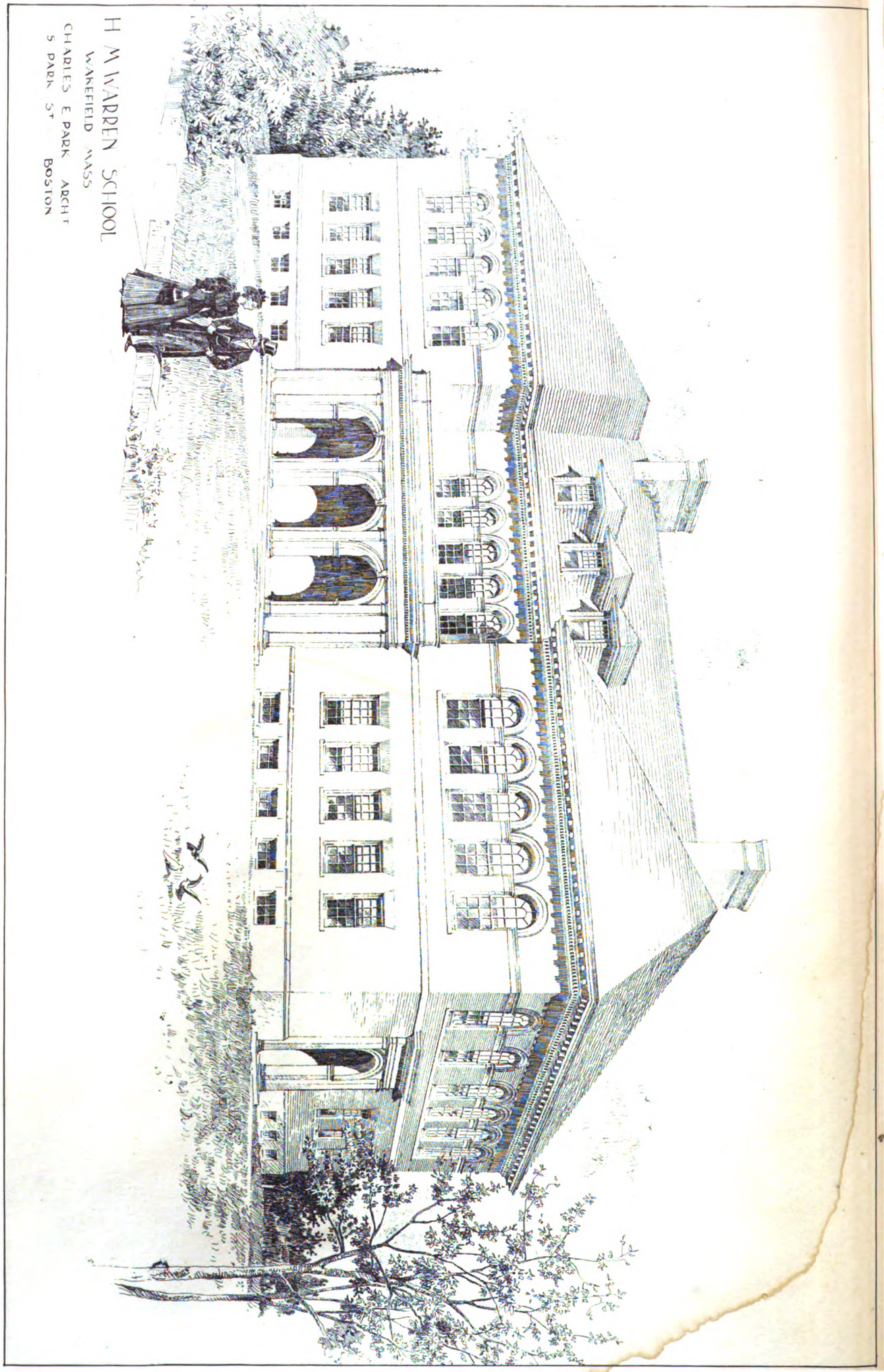
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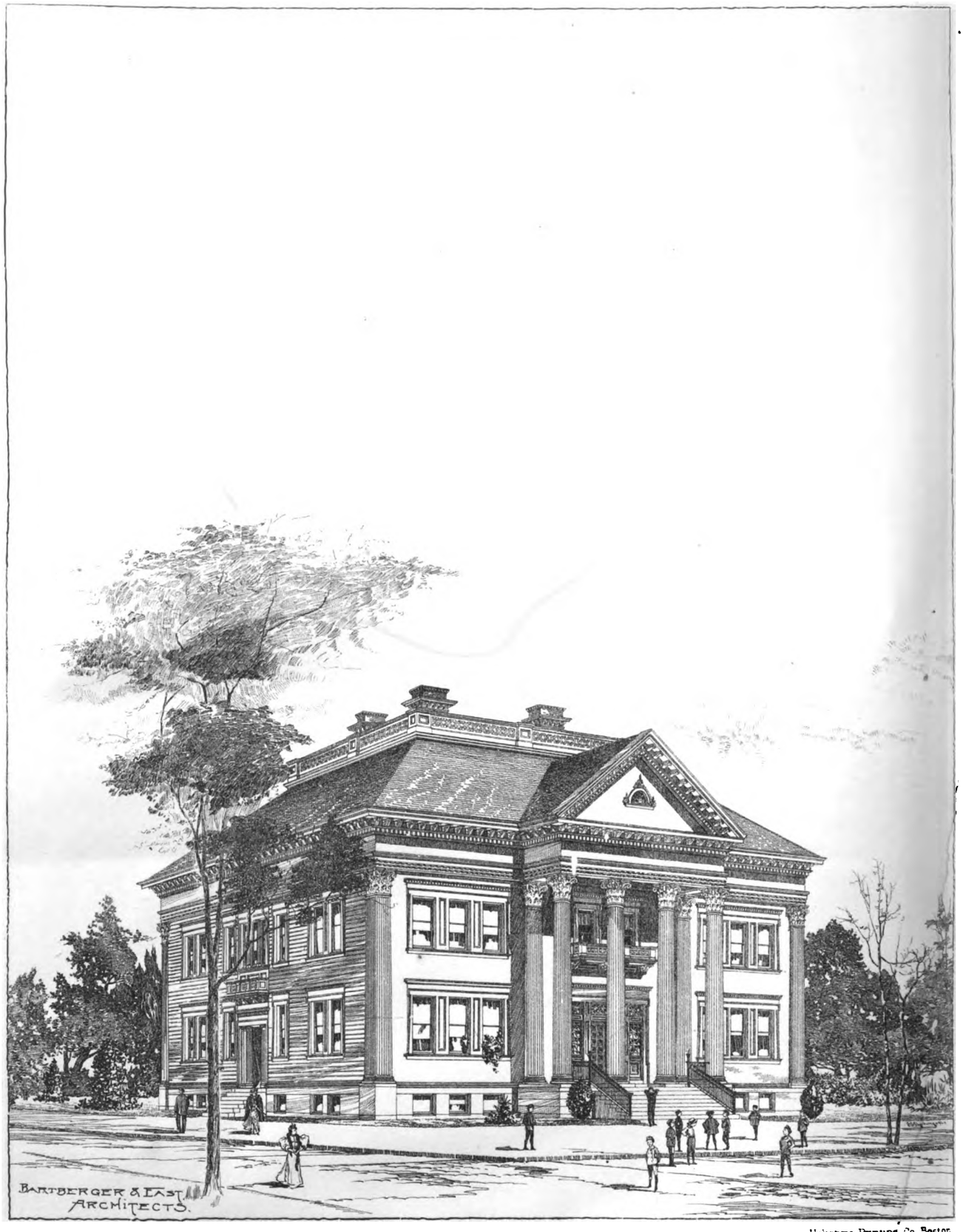


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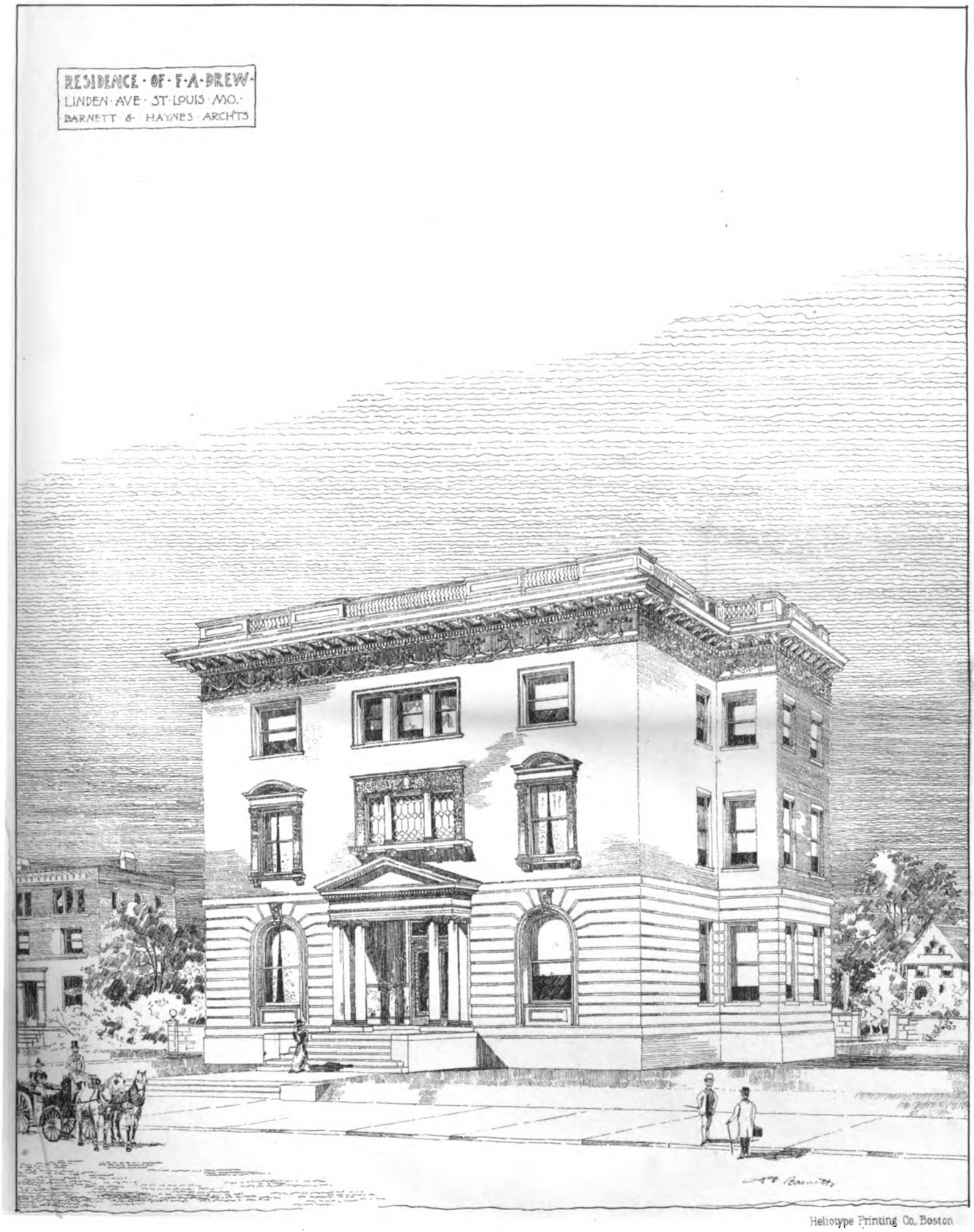


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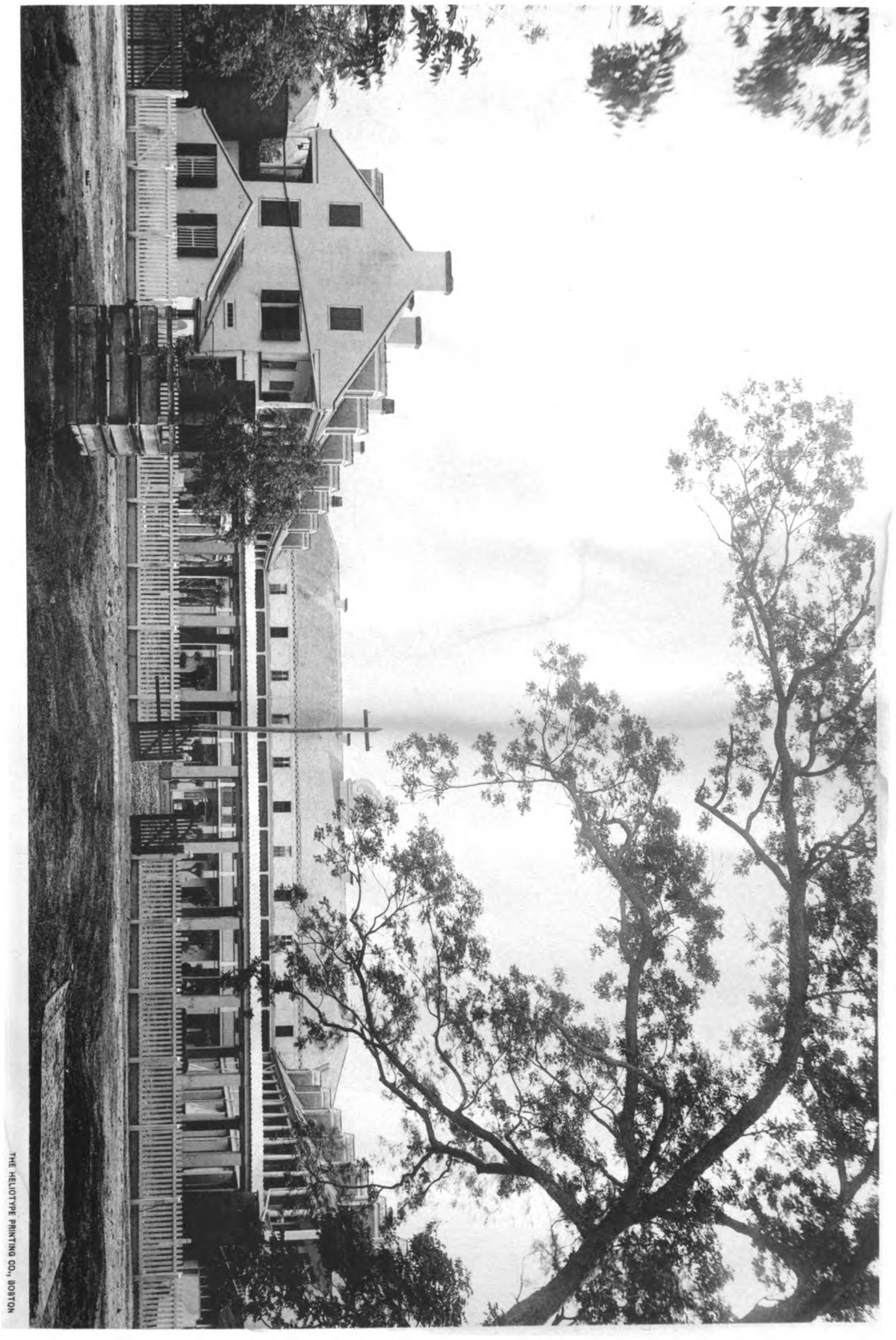
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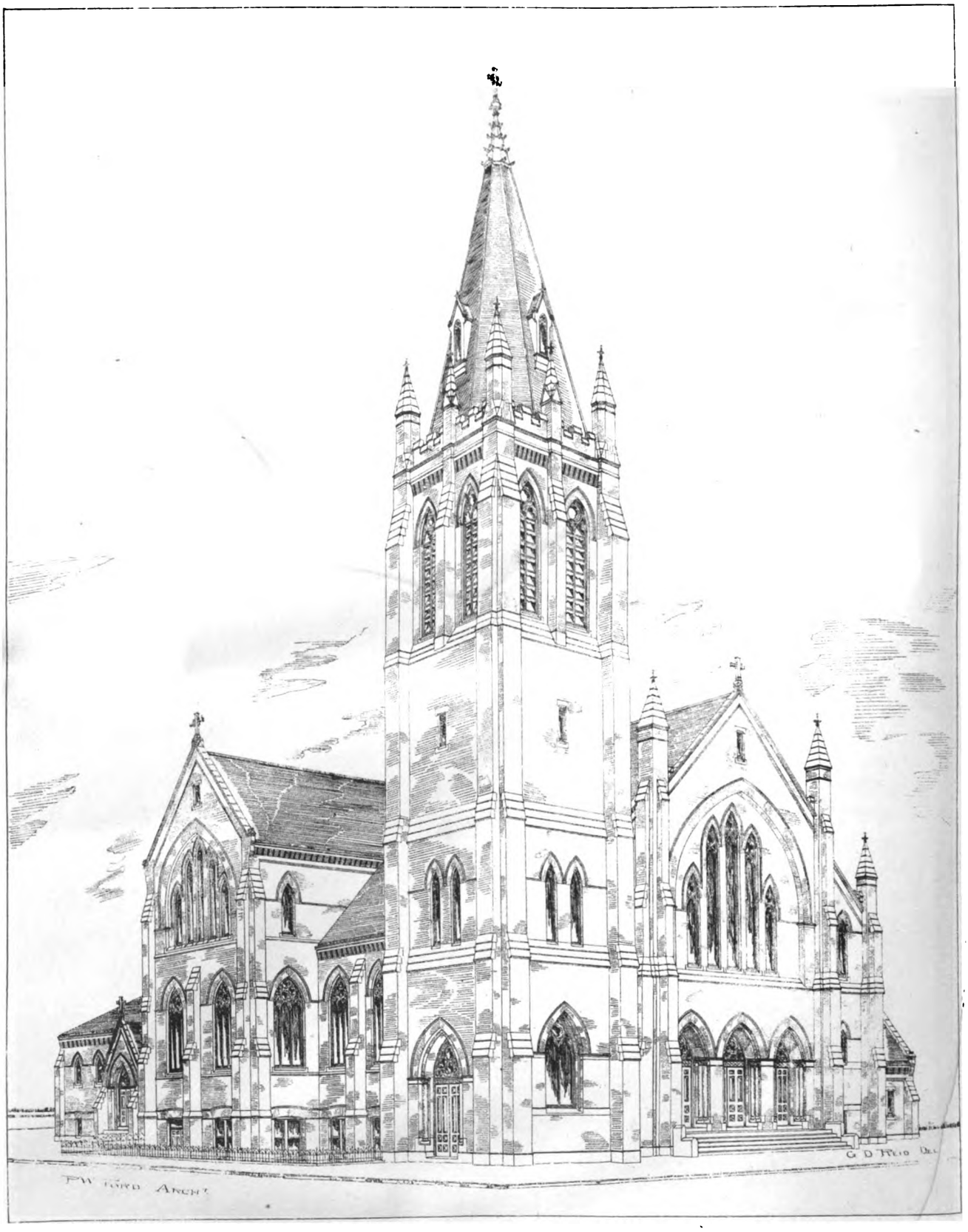
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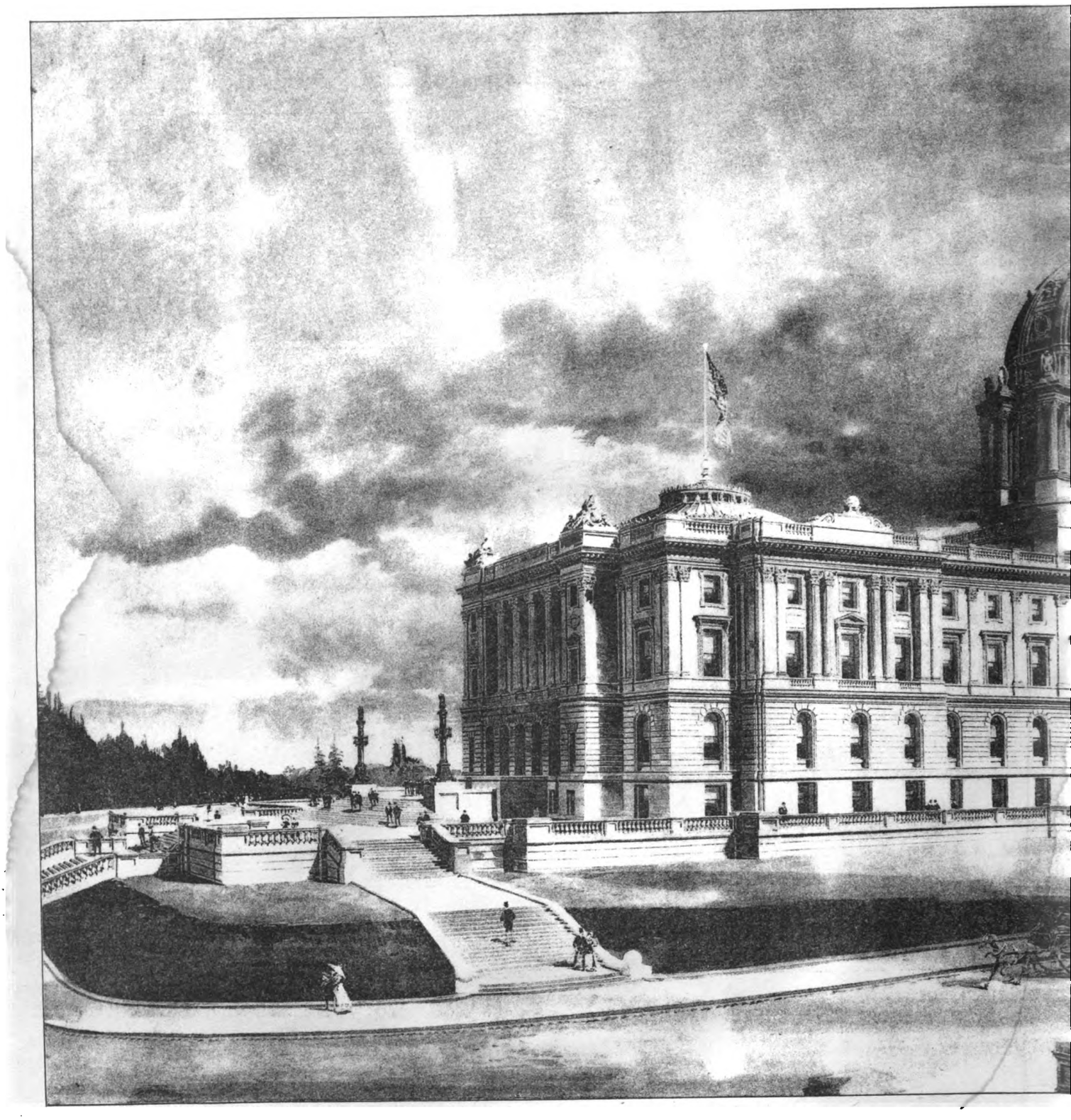
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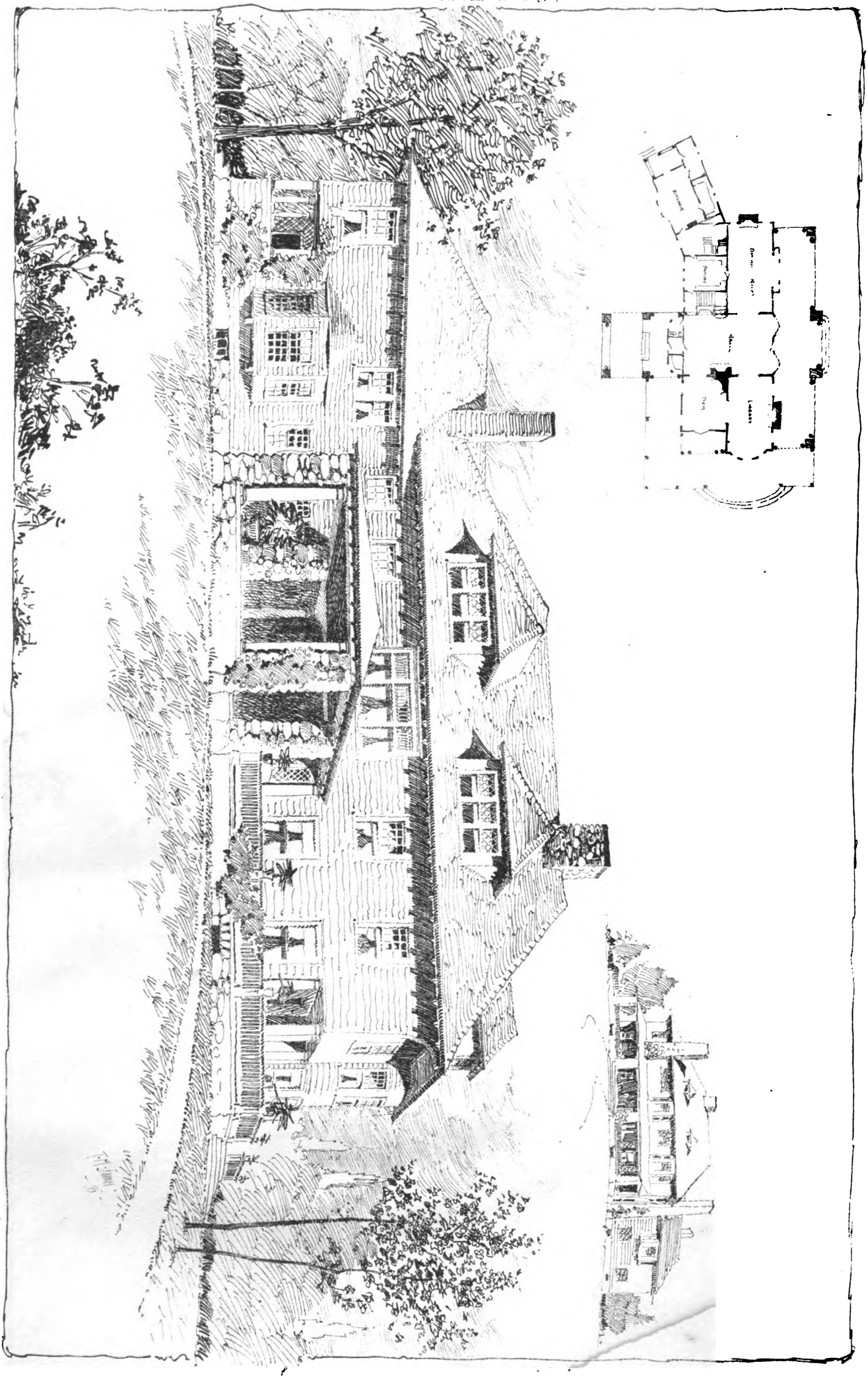
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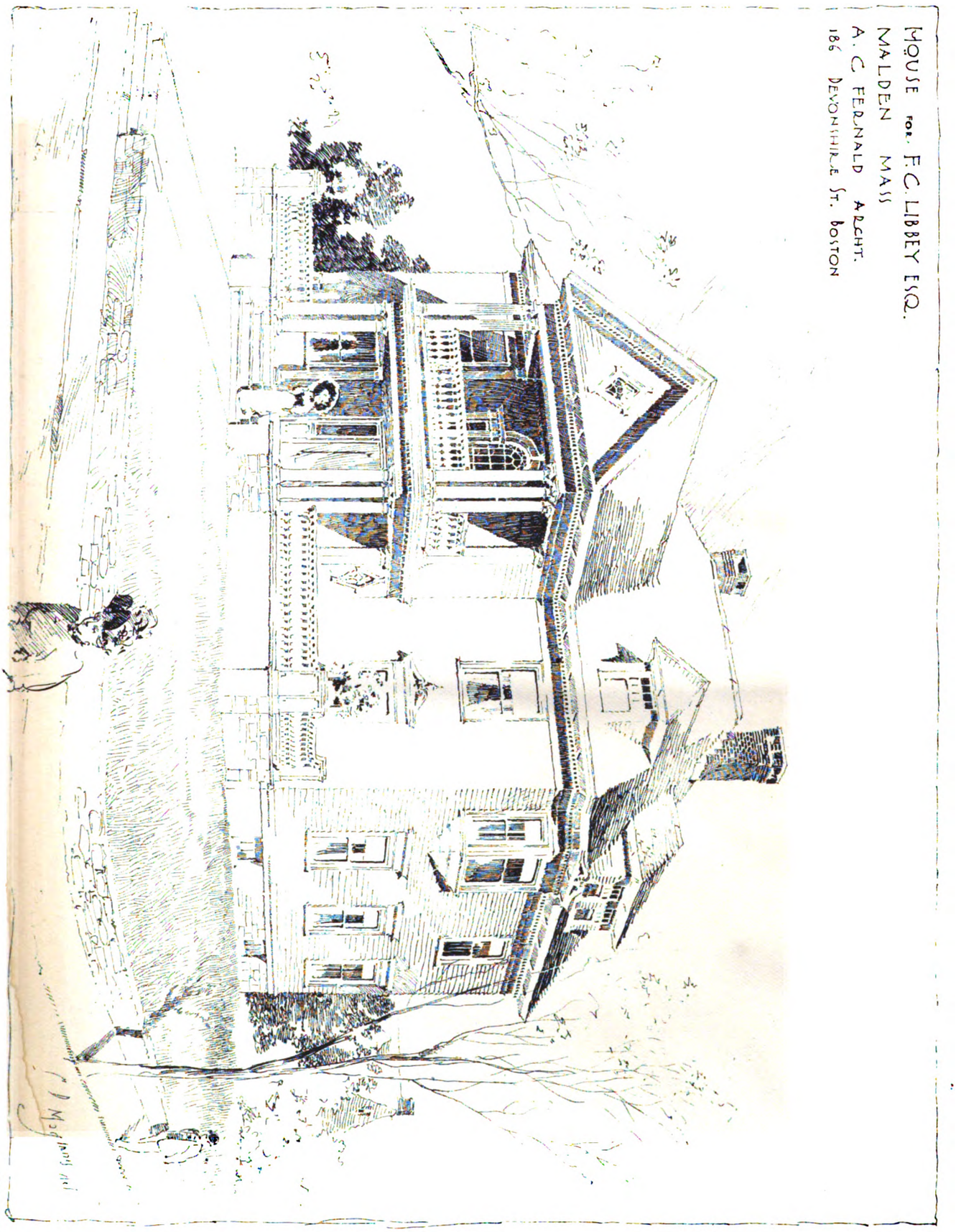
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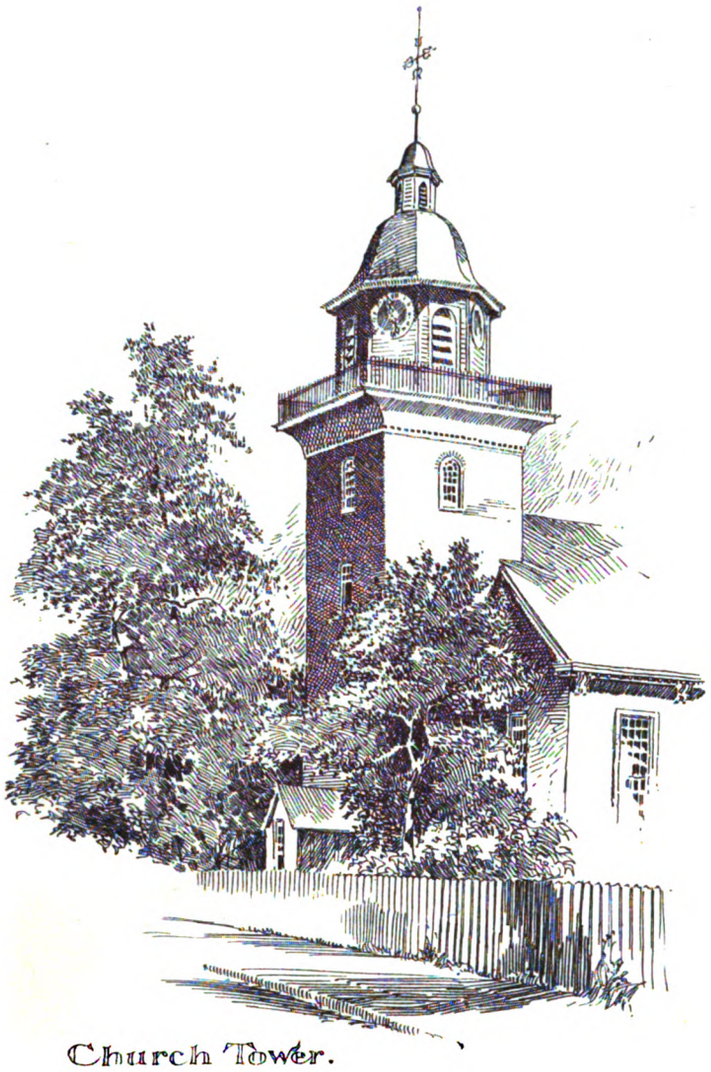
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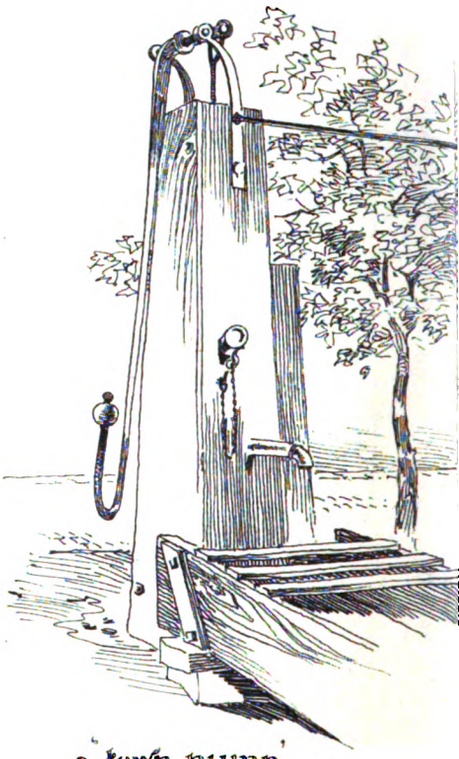
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Sketches in Economy. O

the town of the Economites on the banks of the Ohio River, built about 100 years ago.



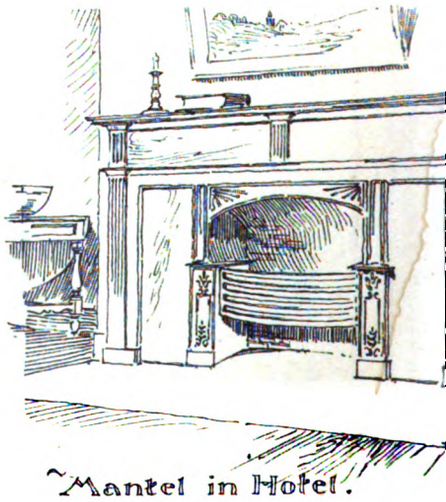
Church Tower.



a town pump



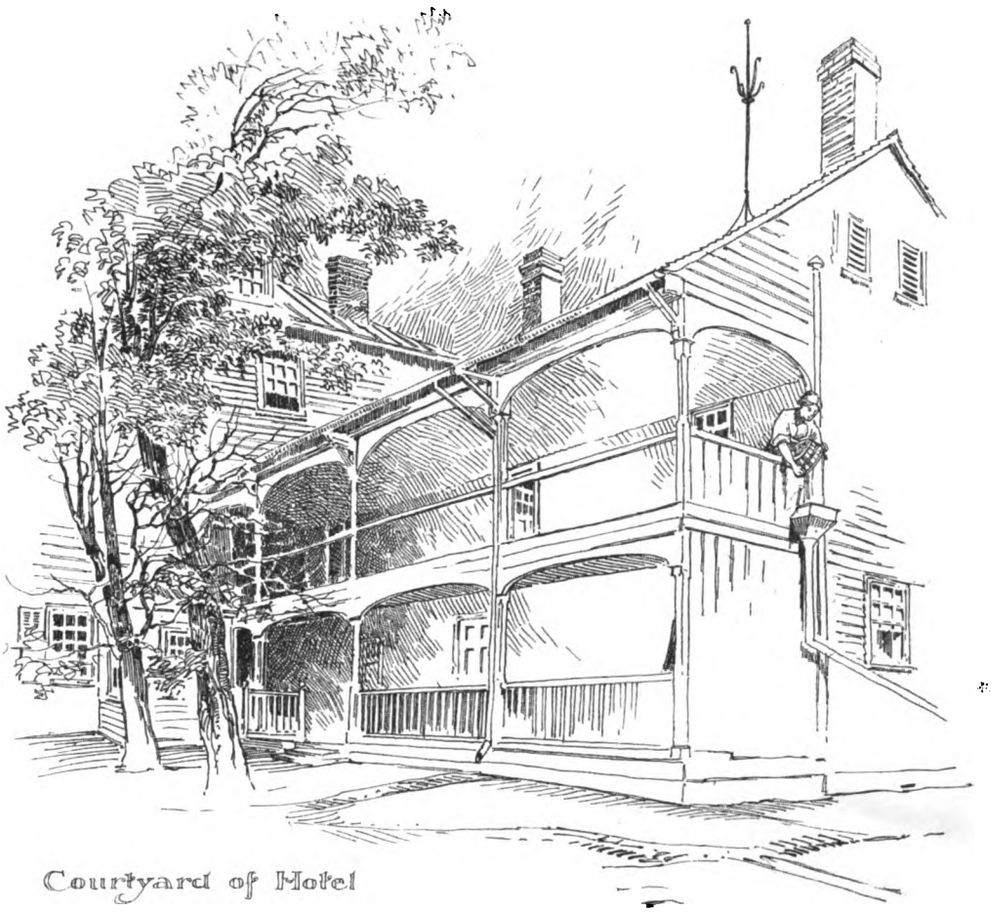
a peep from Church Tower



Mantel in Hotel.

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Courtyard of Hotel



'an evening silhouette'

E. Elwood Deane.

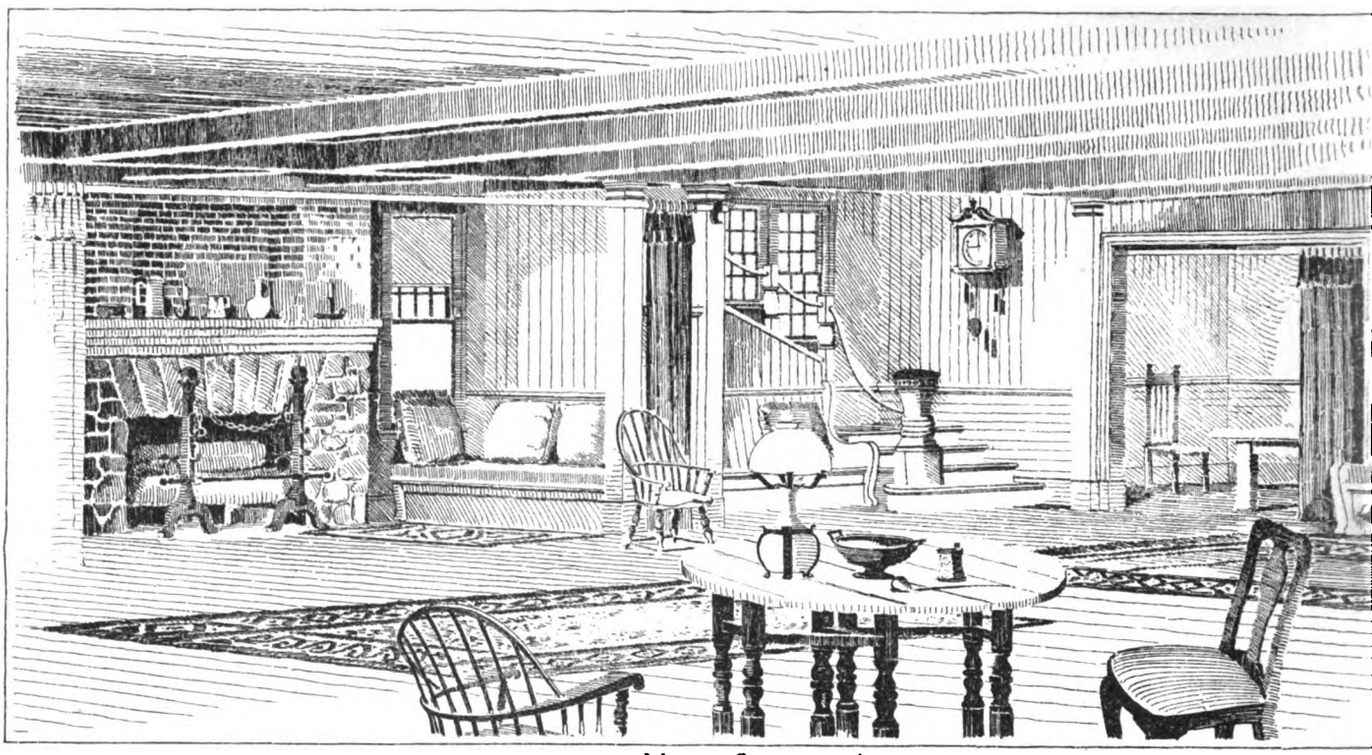
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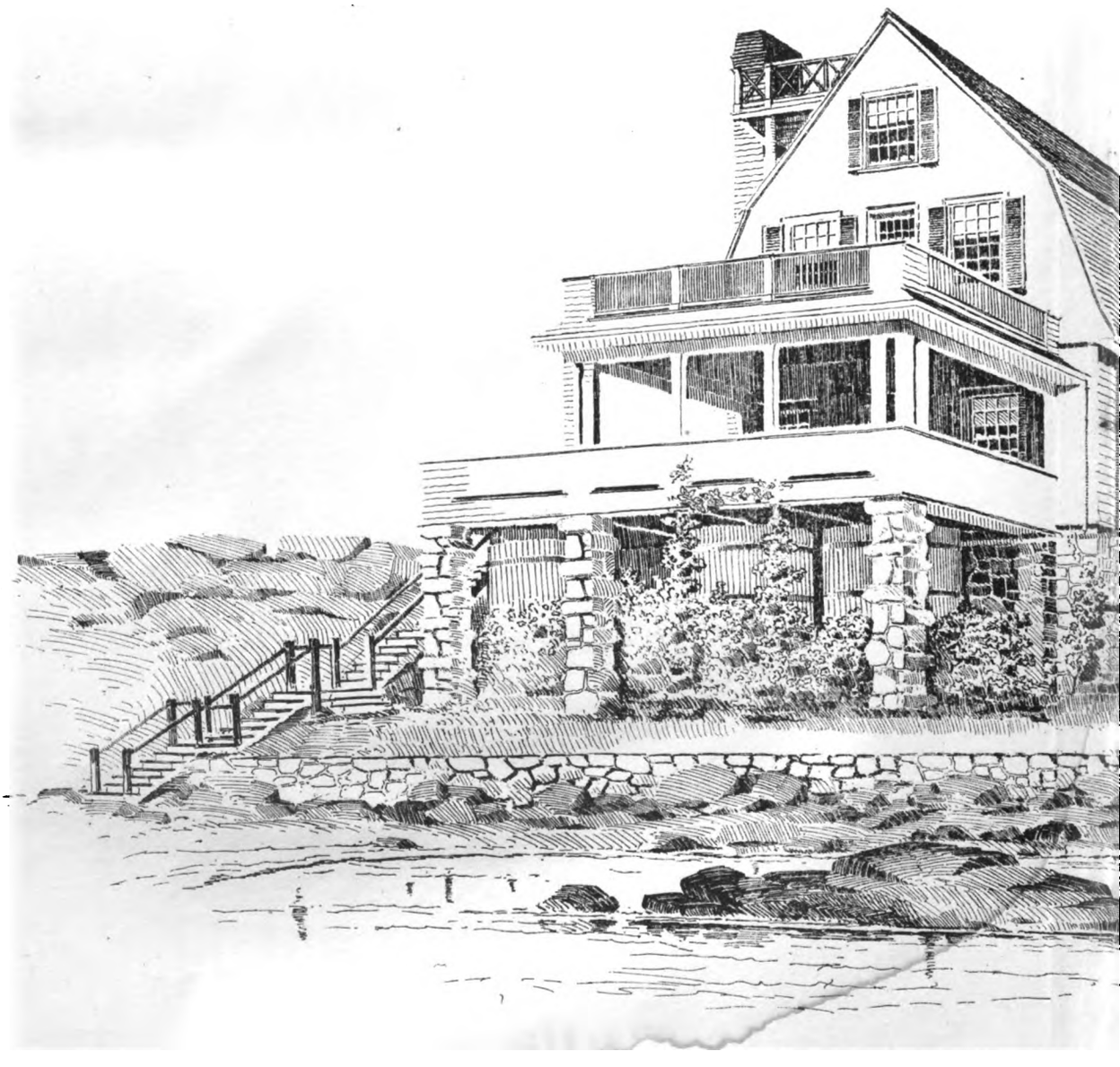
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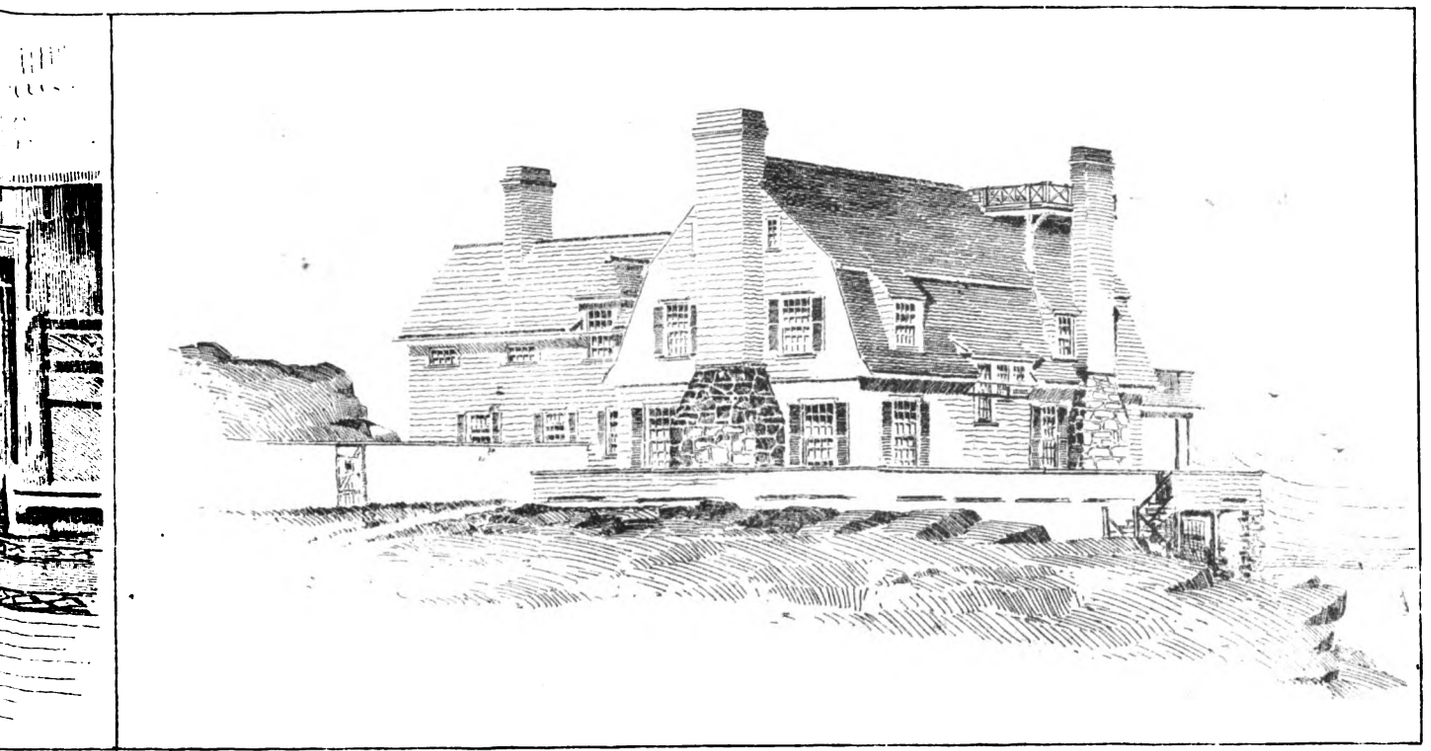
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MIDDLE BREWSTER



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Northerly View

John A. Fox Architect



Southerly View

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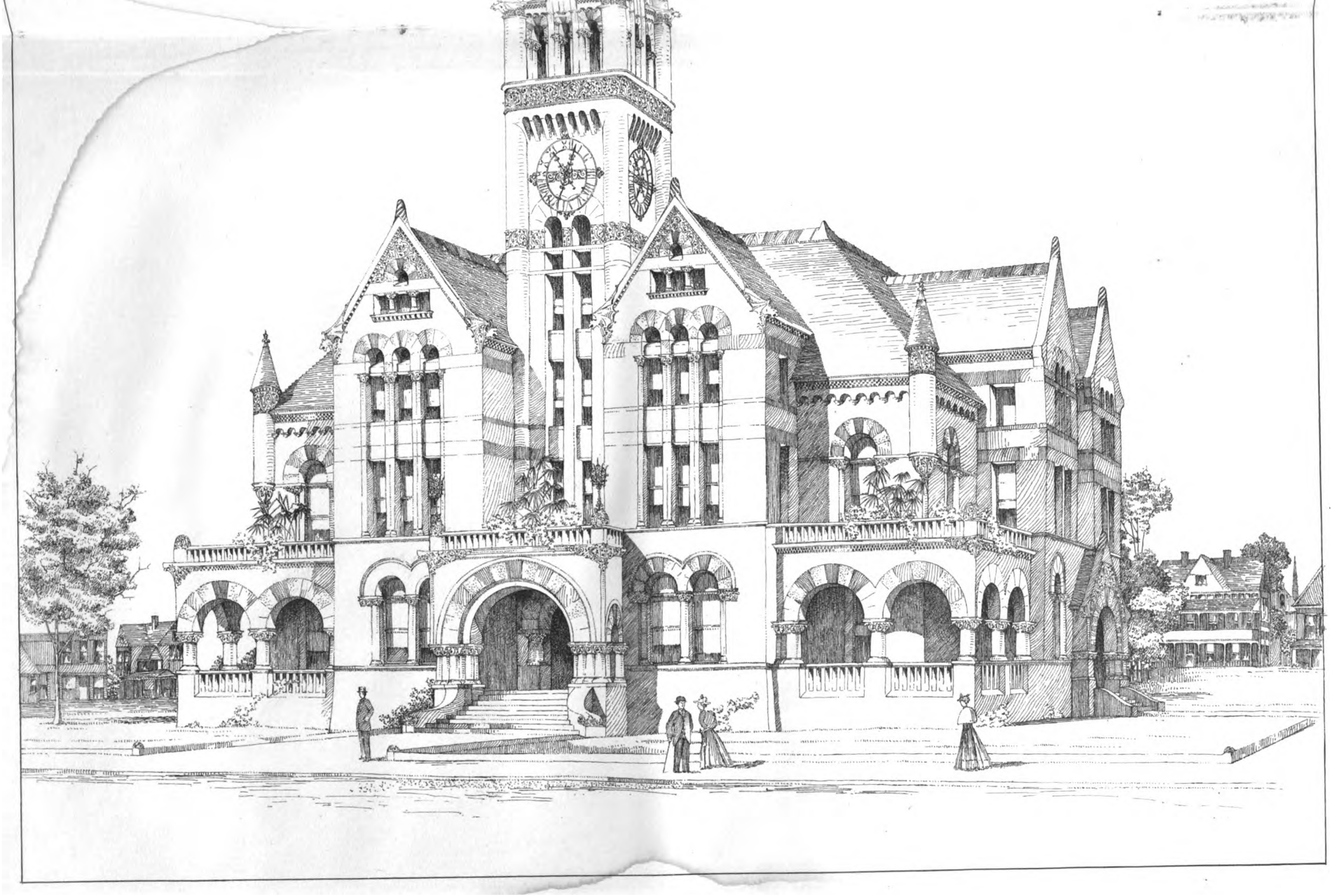
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CLUB-HOUSE OF THE CALUMET CLUB, MICHIGAN AVENUE AND TWENTIETH STREET, CHICAGO, ILL.

CHARLES S. FROST, Architect.

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Newton National & Savings Banks.

1st Floor Plan.

Wm. Gibbons Preston Architect.

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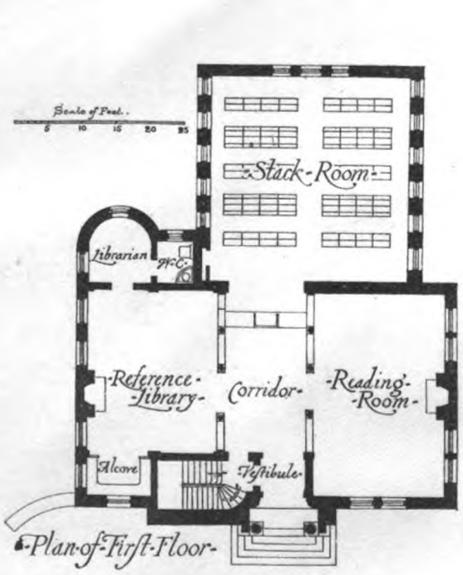
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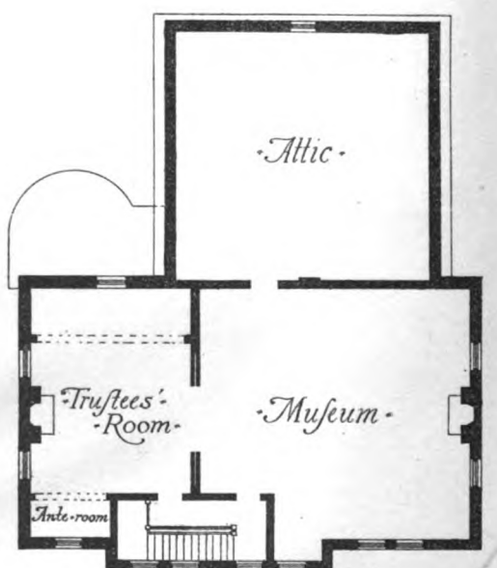


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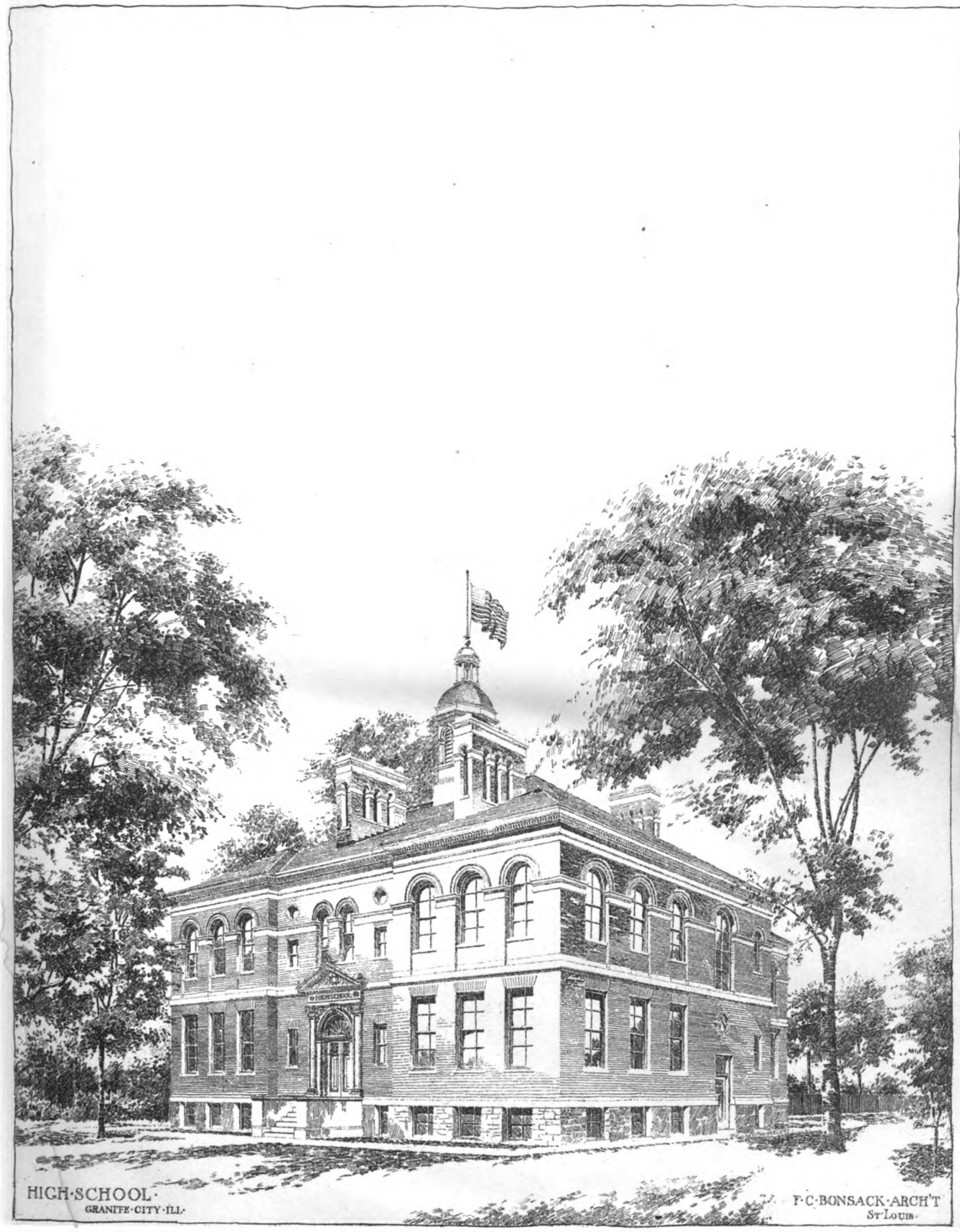


Plan of First Floor



Plan of Second Floor

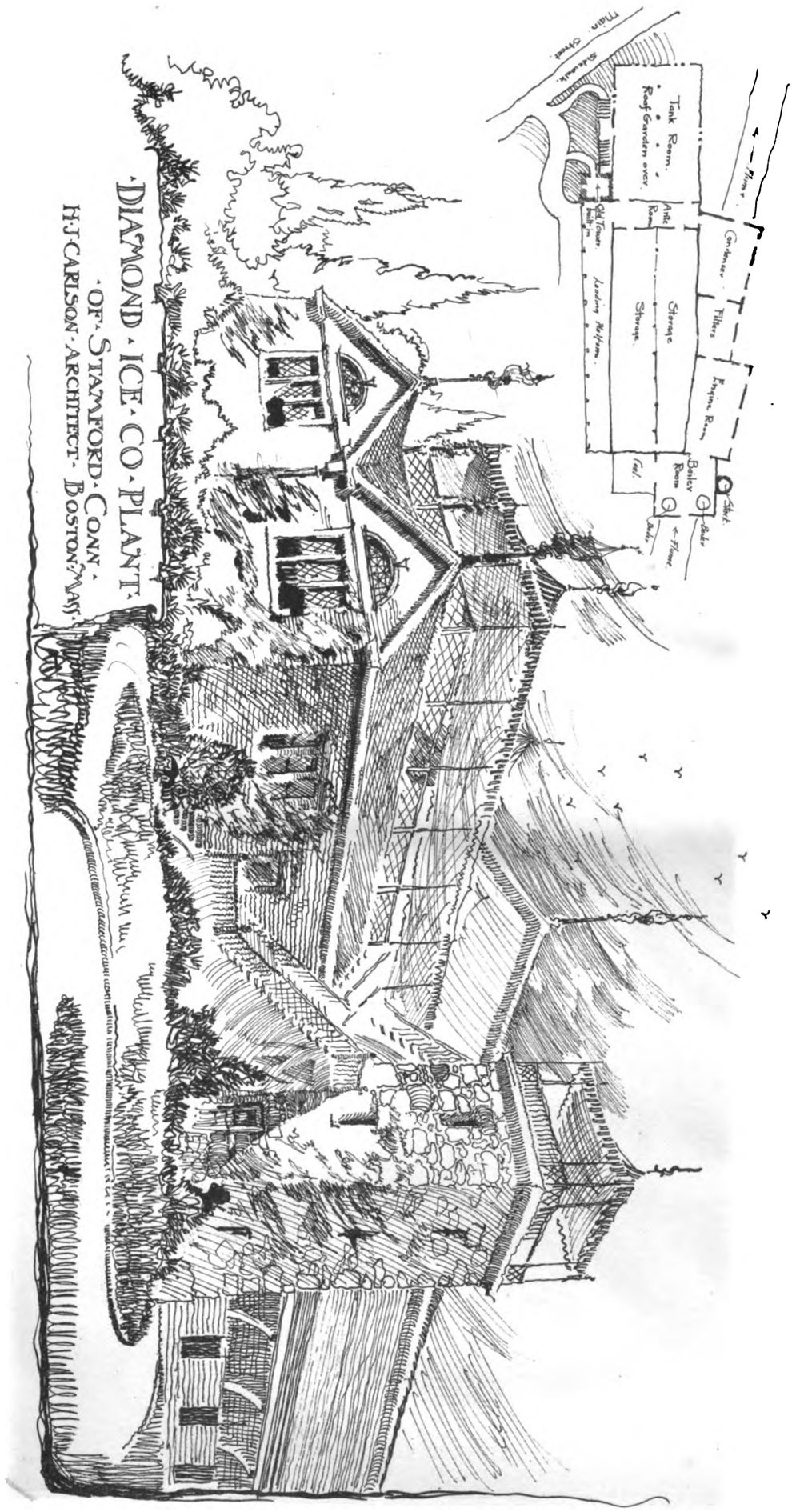
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SHEPLEY, RUTAN & COOLIDGE, Architects. OLMSTED, OLMSTED & ELIOT, Landscape Architects.

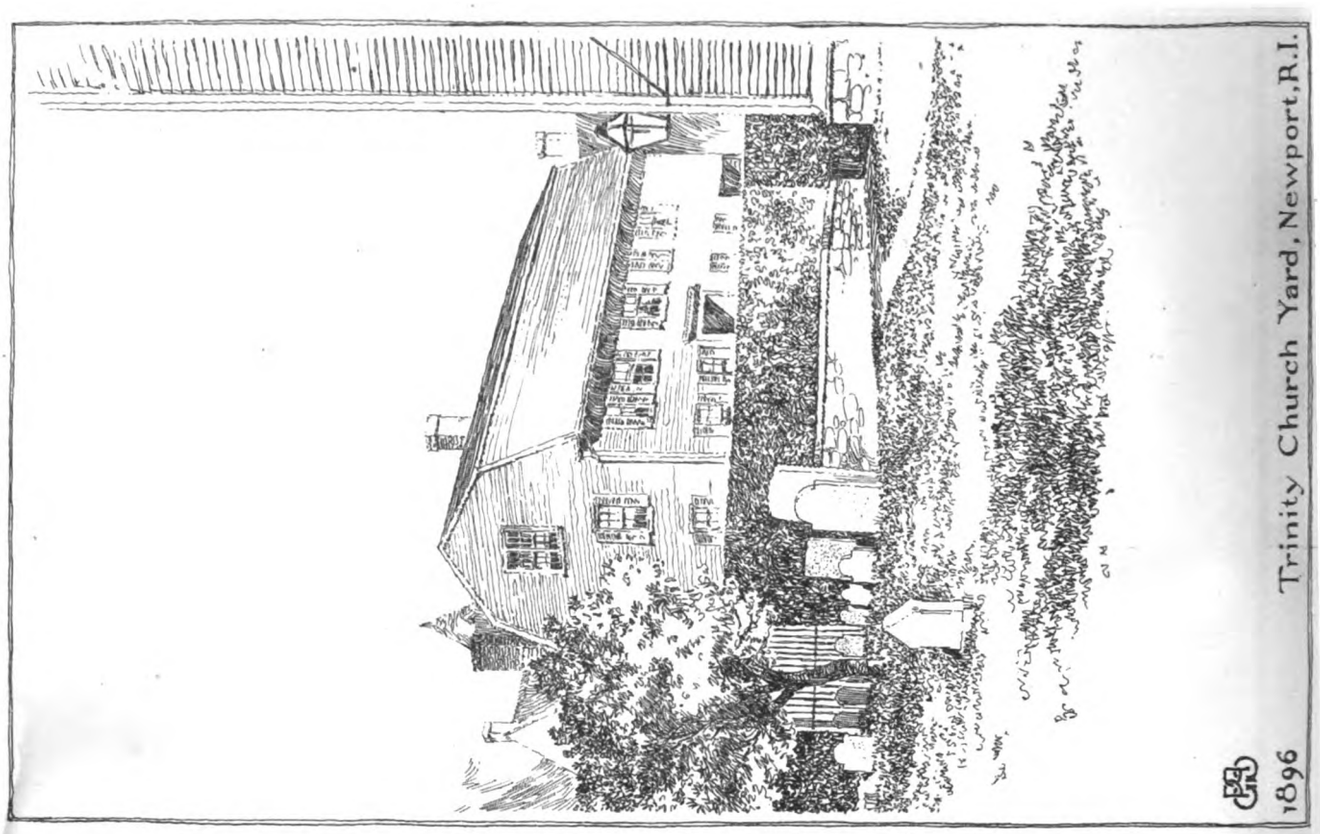
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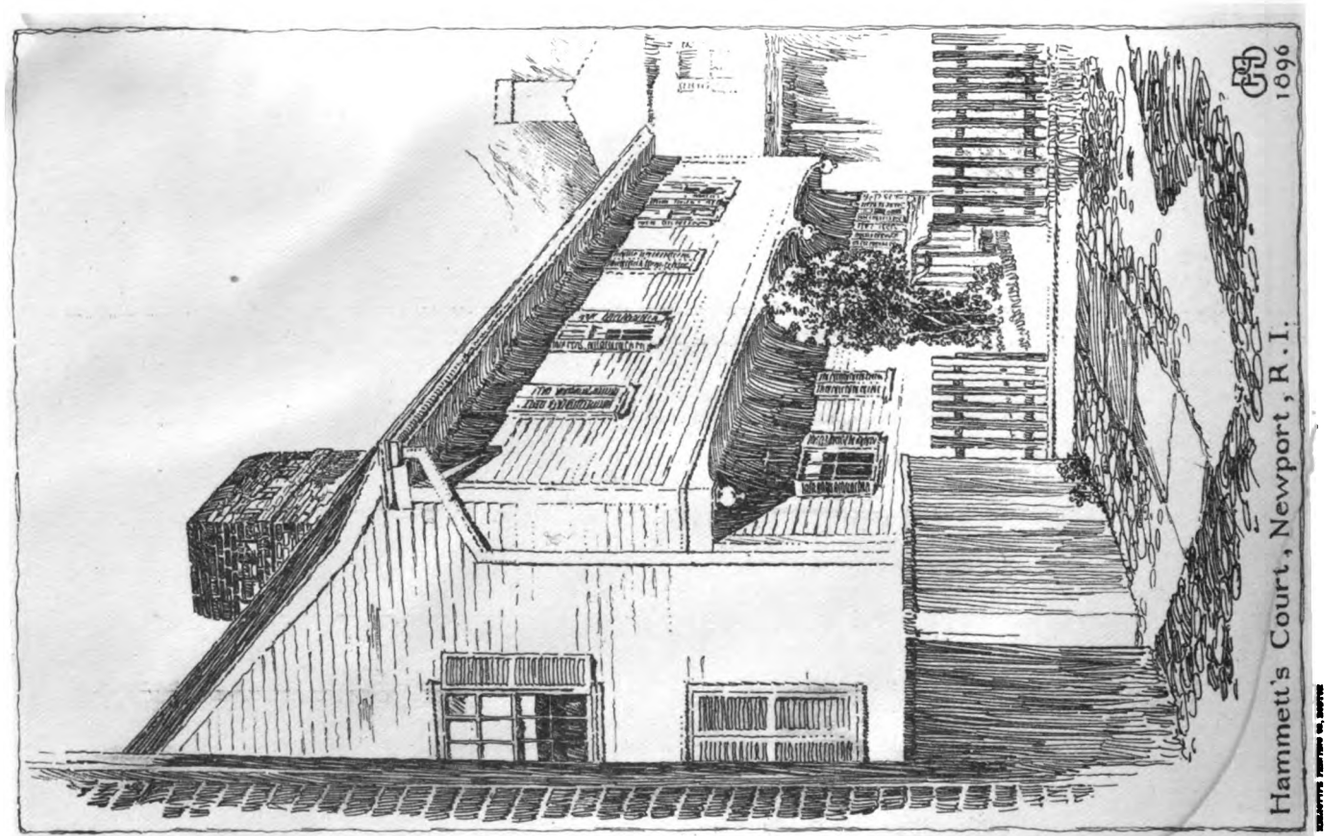
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Trinity Church Yard, Newport, R.I.

1896



Hammett's Court, Newport, R.I.

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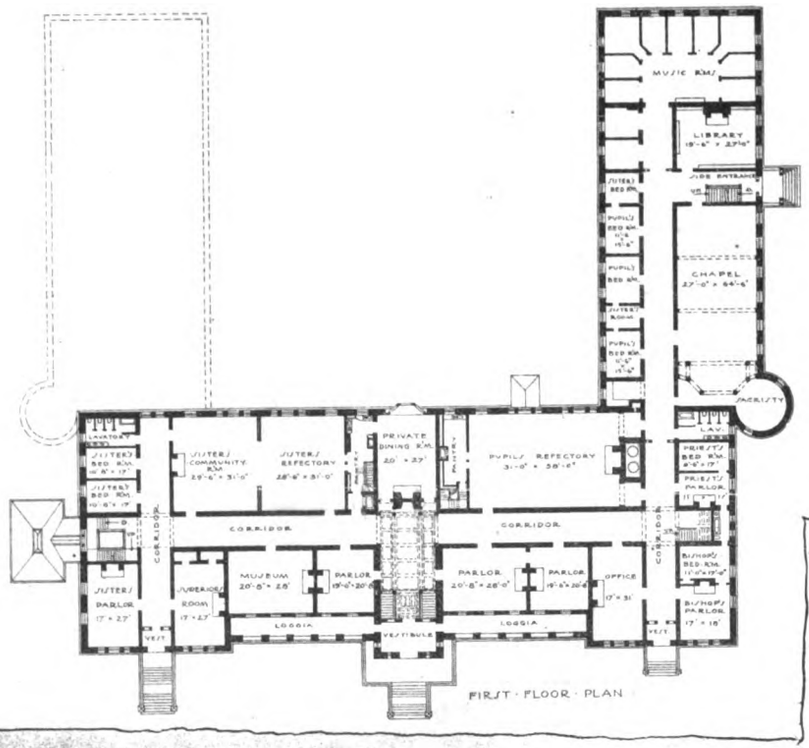
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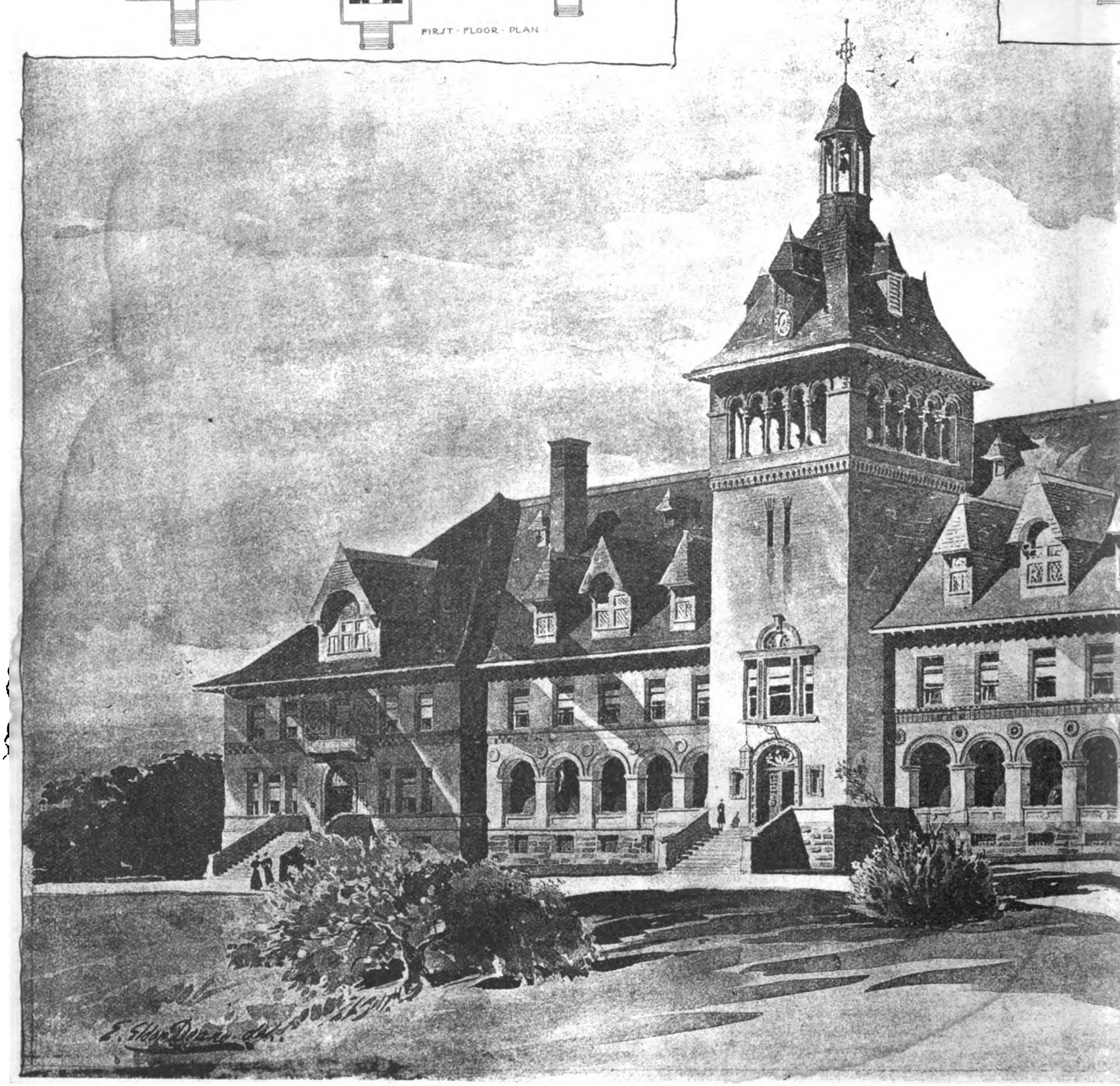
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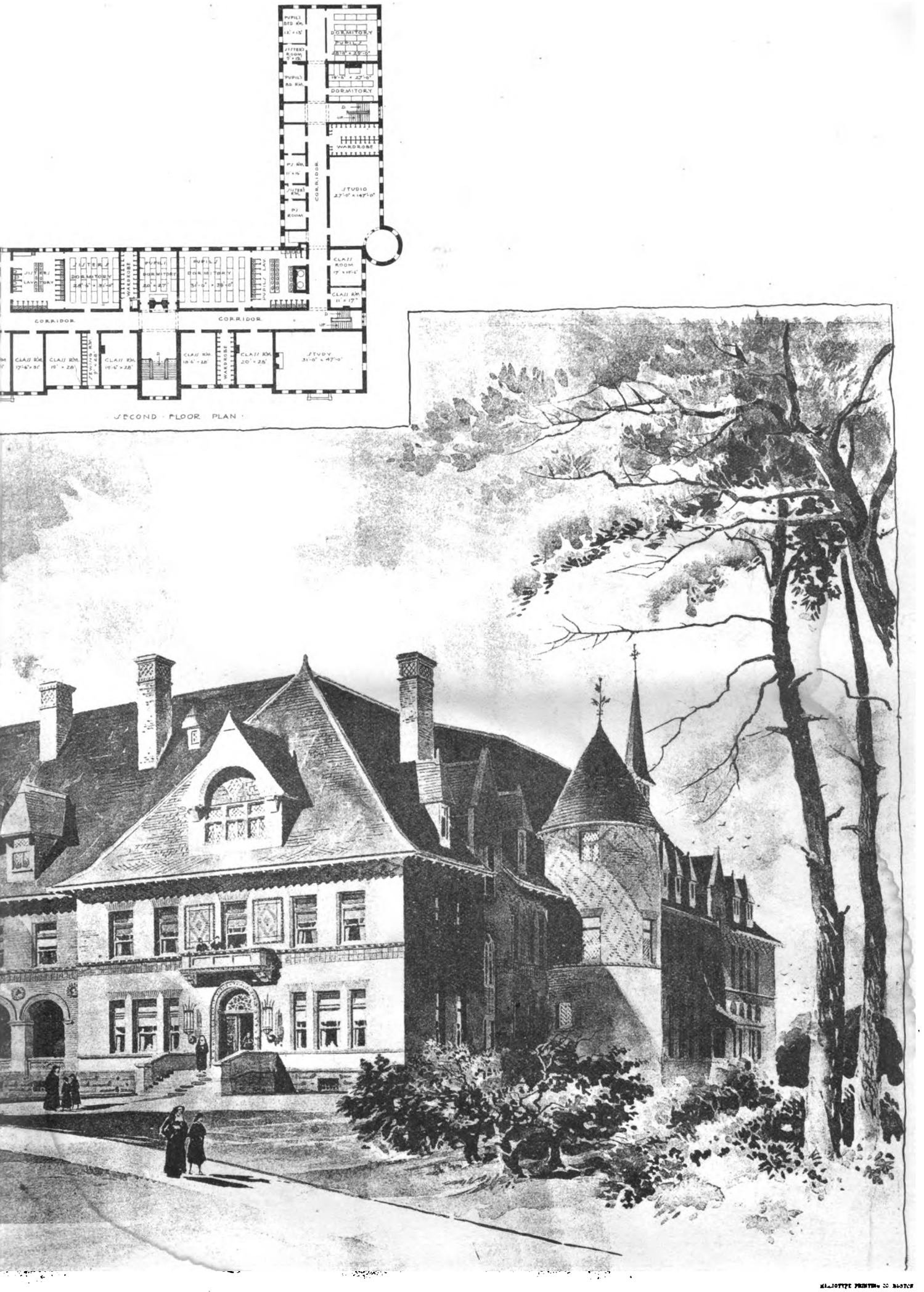


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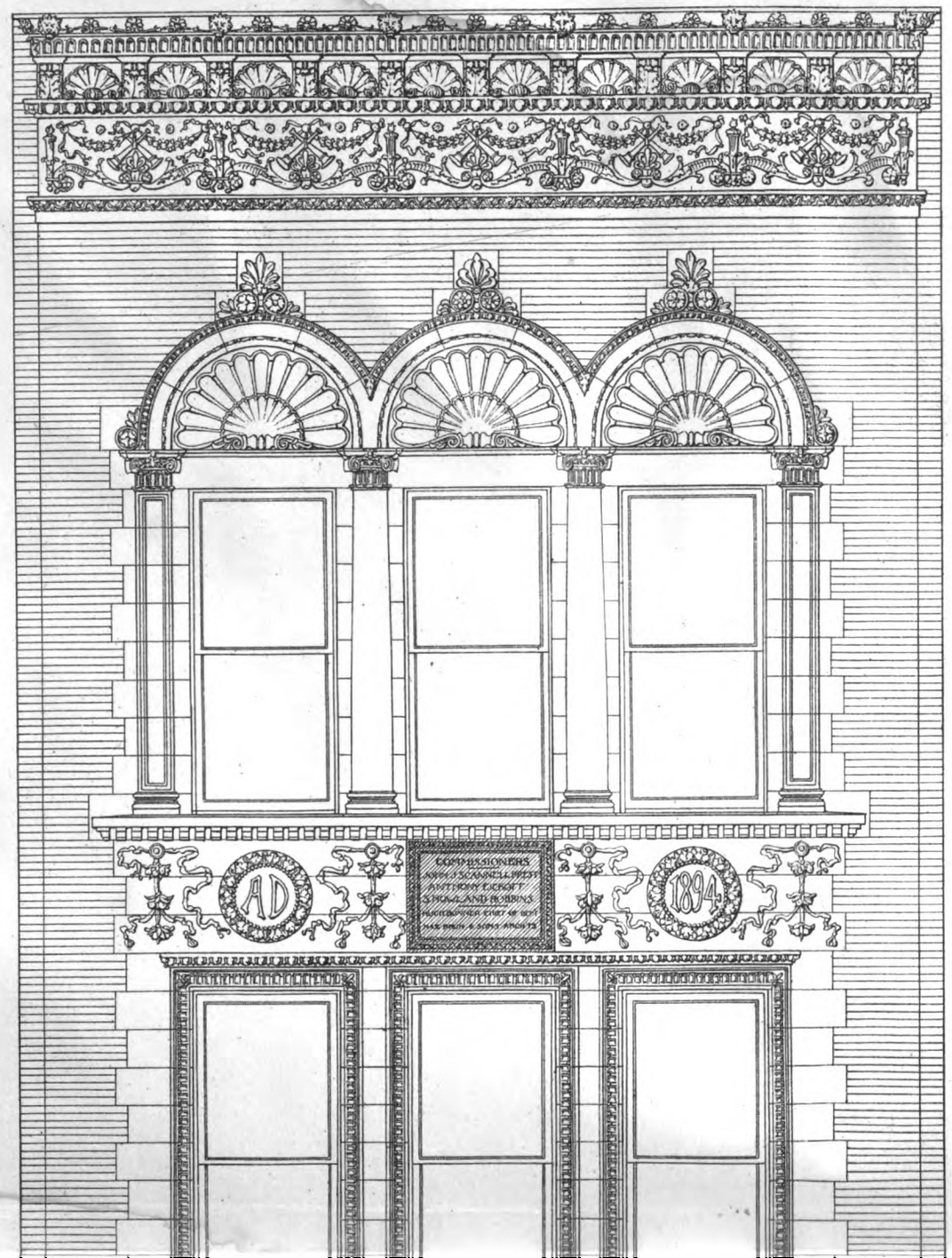
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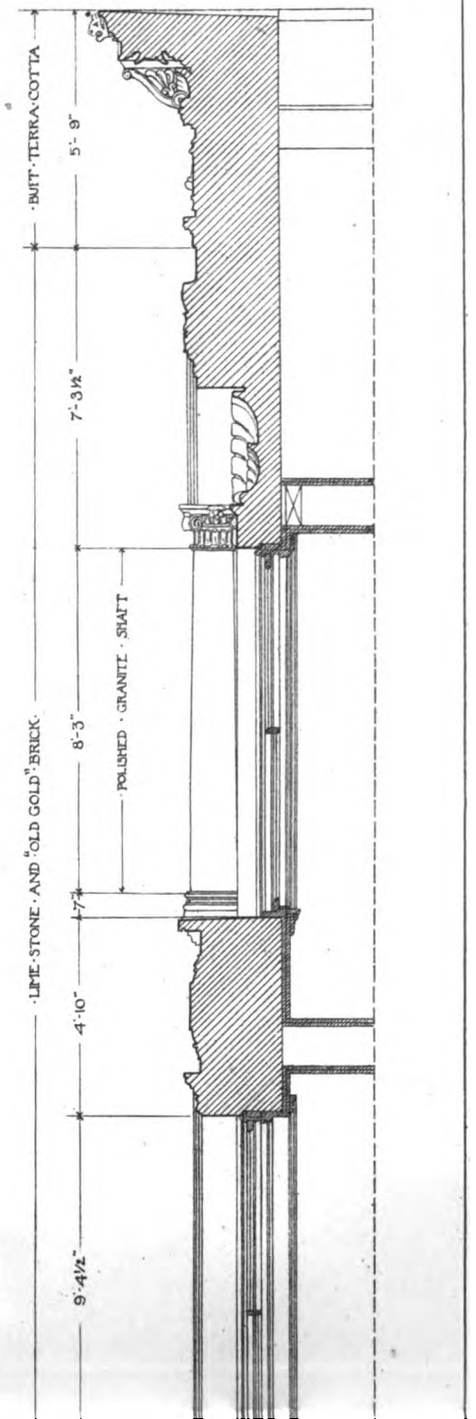
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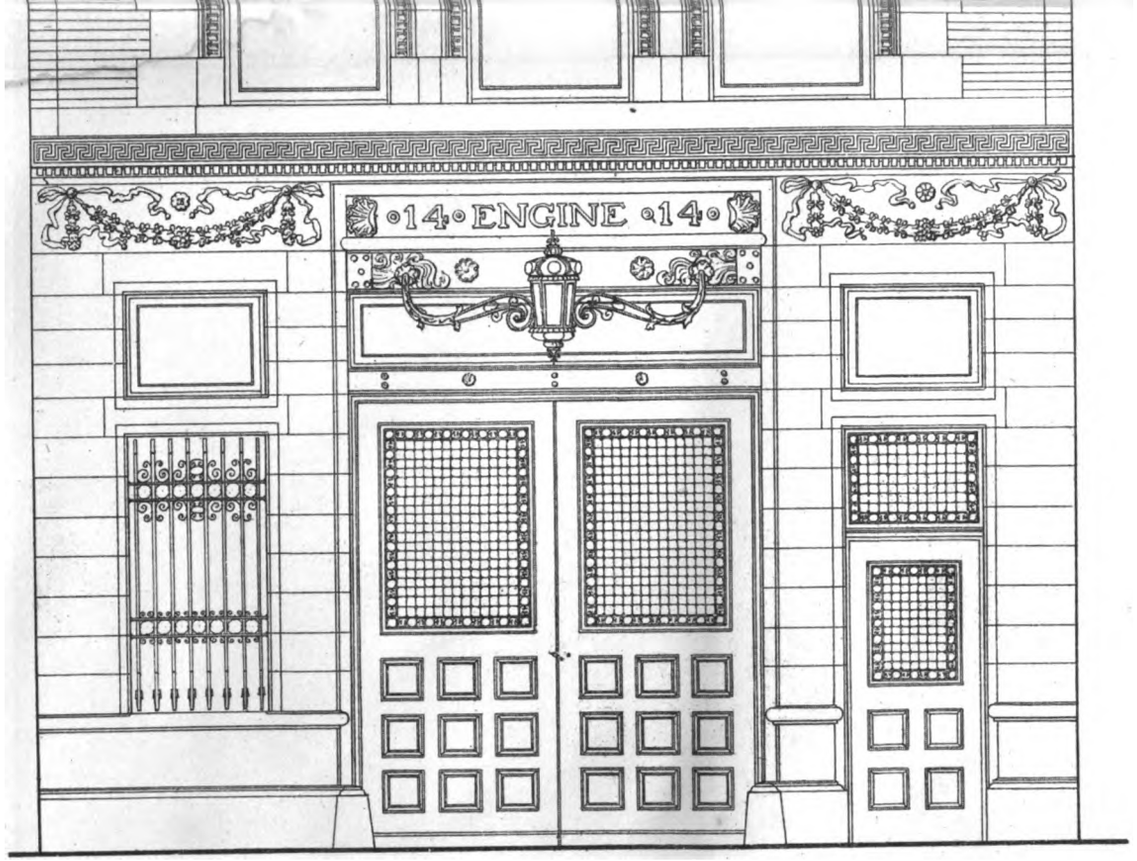
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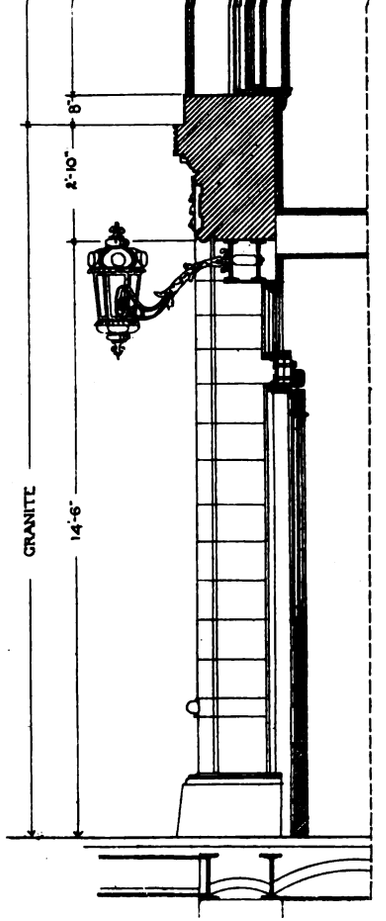
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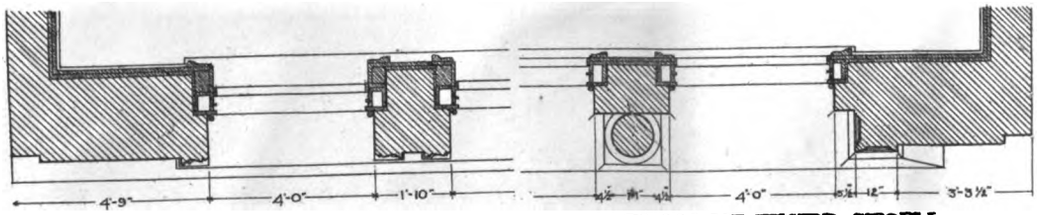




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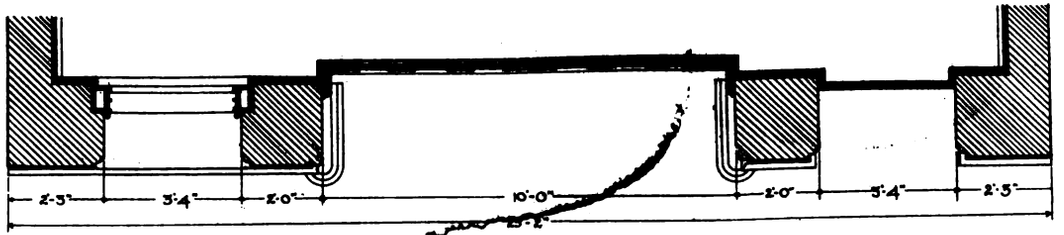






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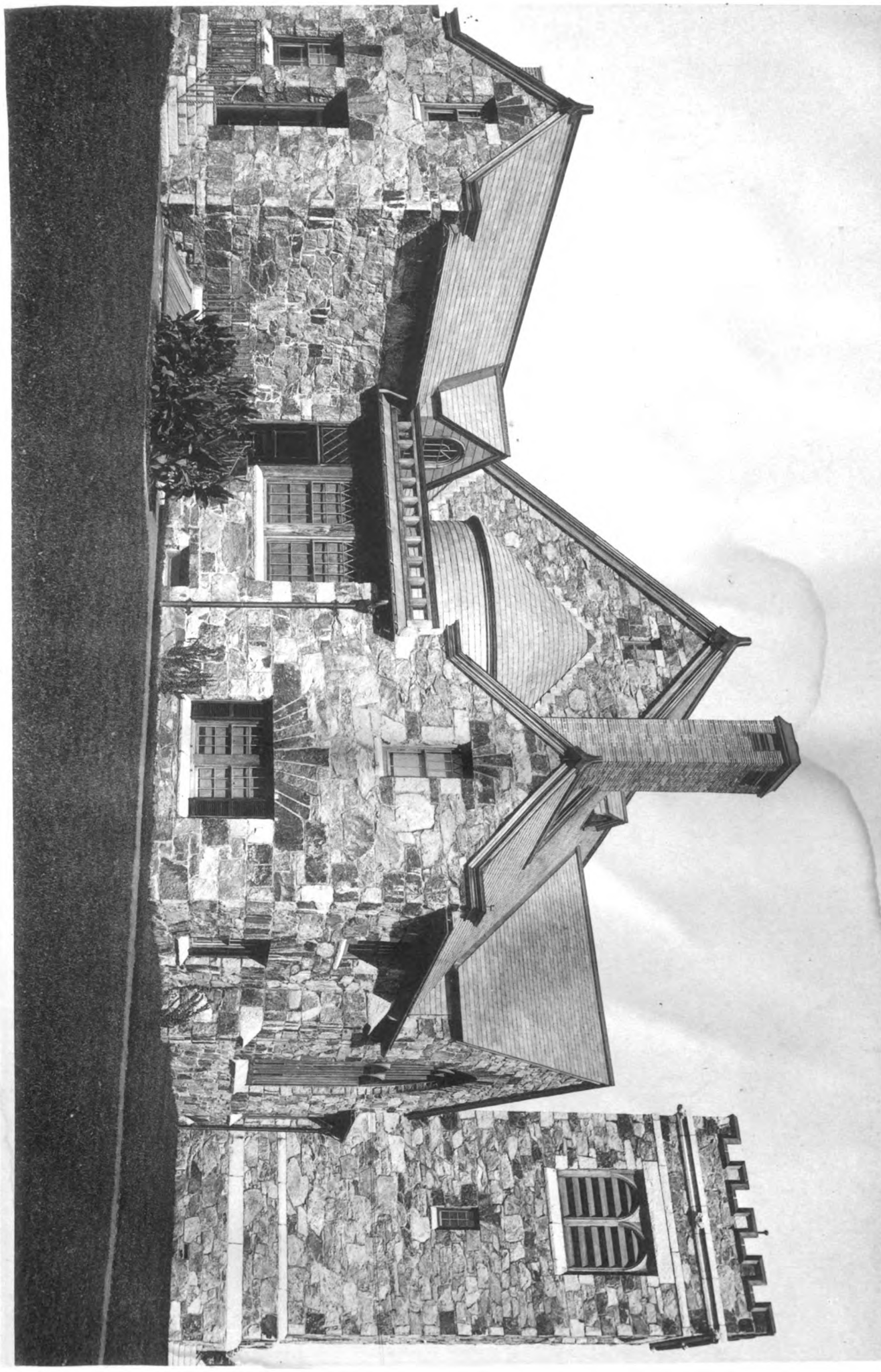
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SKETCH FOR WAREHOUSE

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A.V. PORTER: ASSOCIATE.

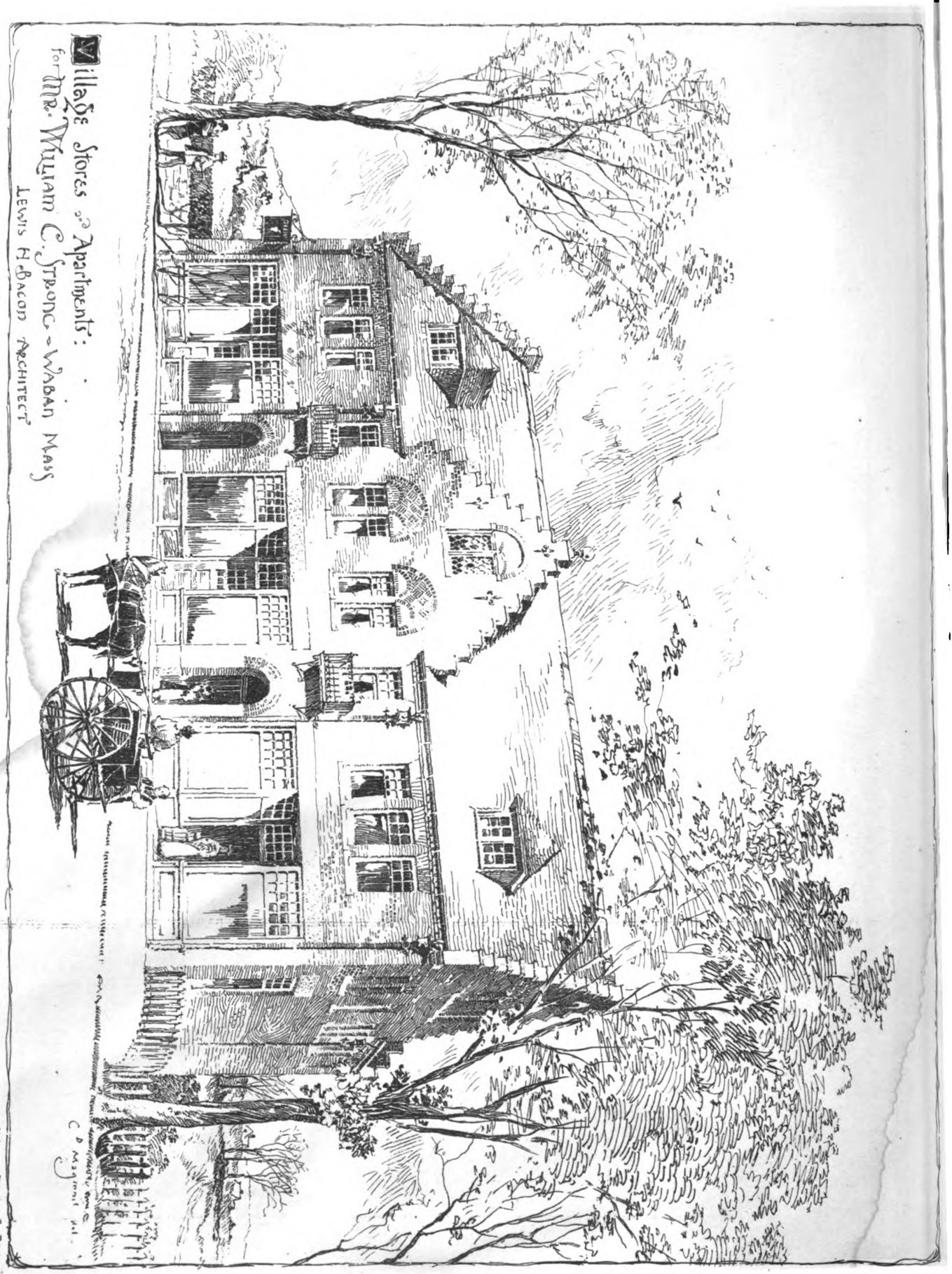


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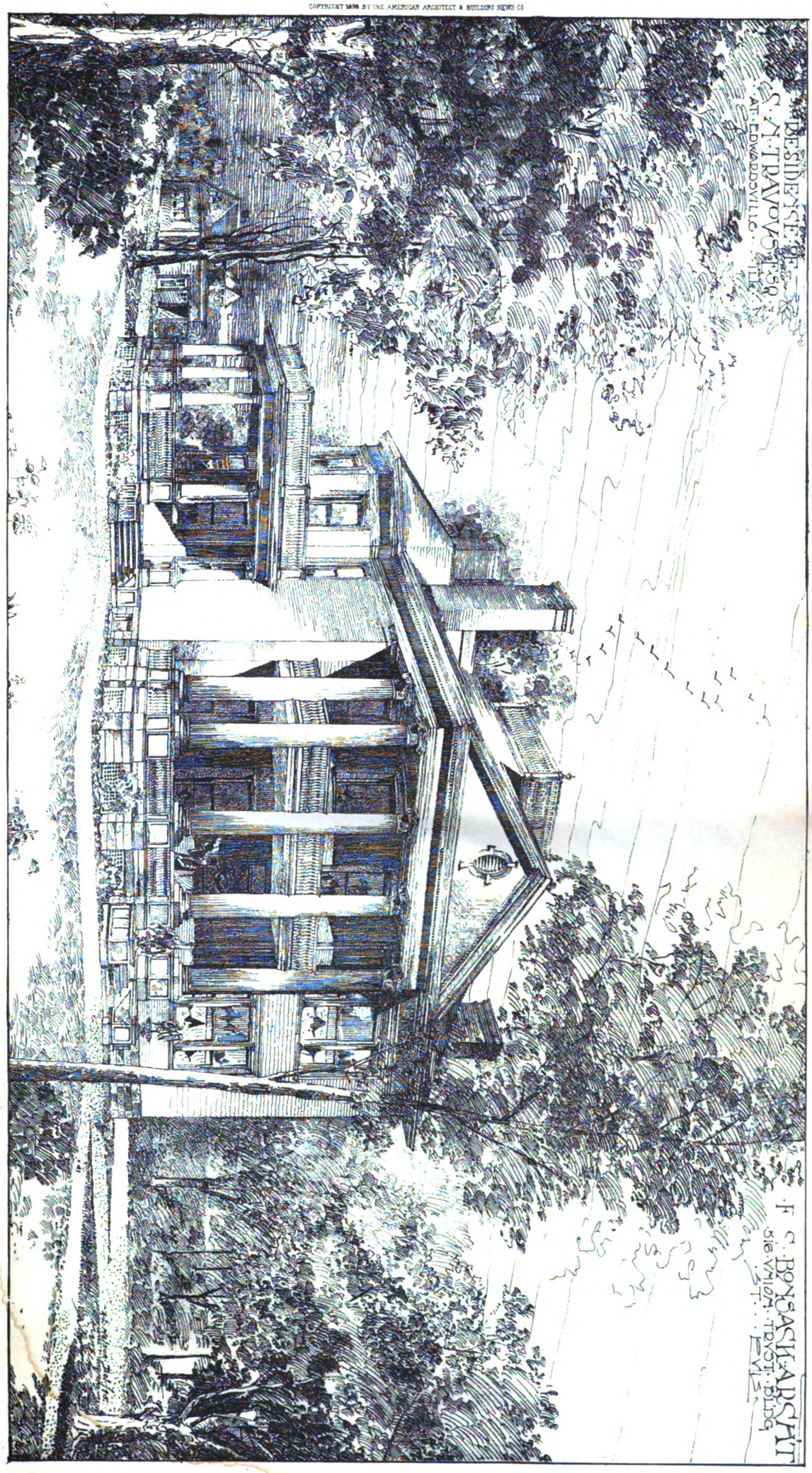


Village Stores & Apartments:
for MR. WILLIAM C. STRONG - WABAN MASS
LEWIS H. BACON ARCHITECT

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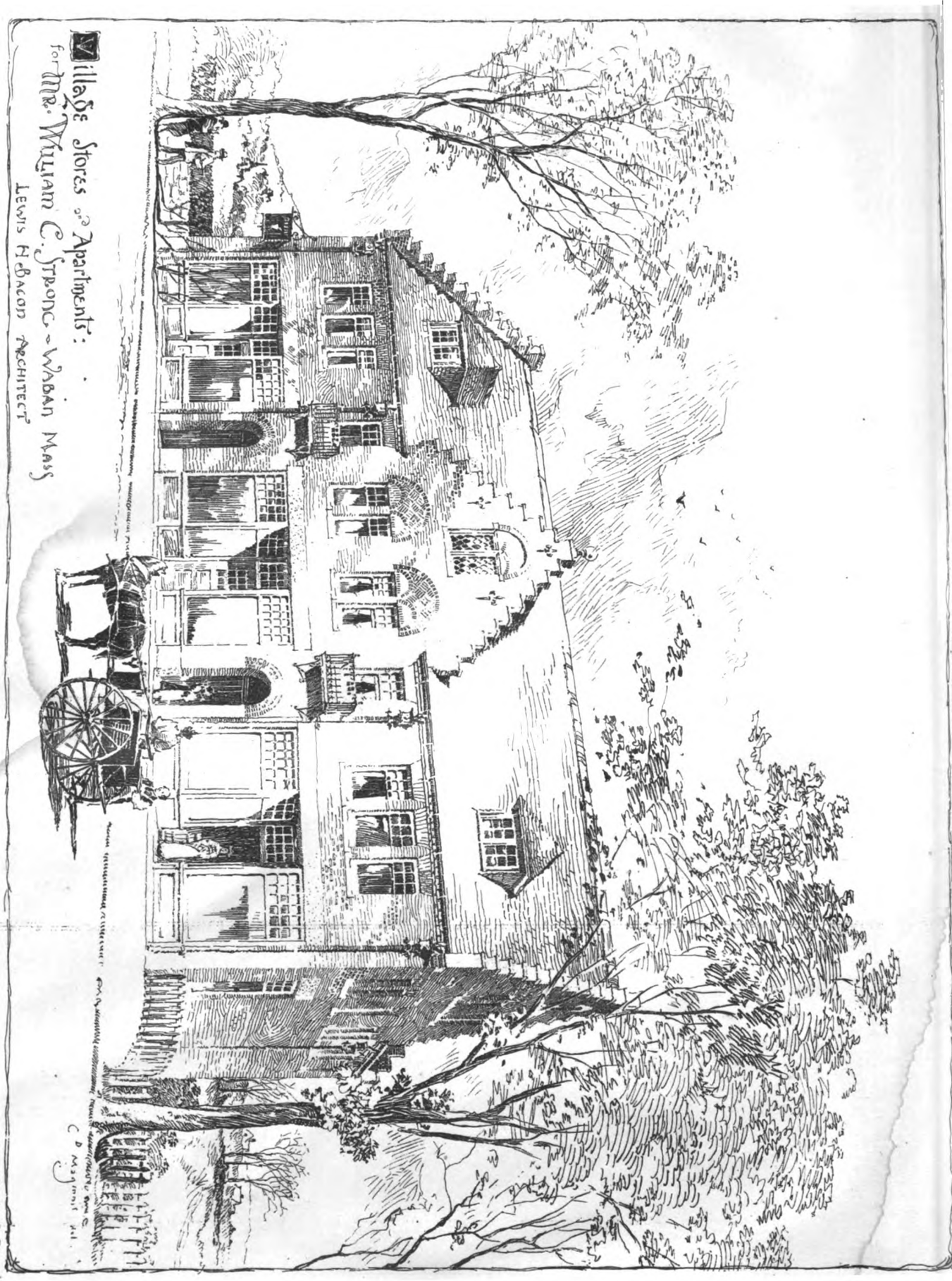
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FIREPLACE IN LADIES' WAITING-ROOM, UNION STATION, ST. LOUIS, MO.

T. C. LINK, Architect. ROBERT BRINGHURST, Sculptor.

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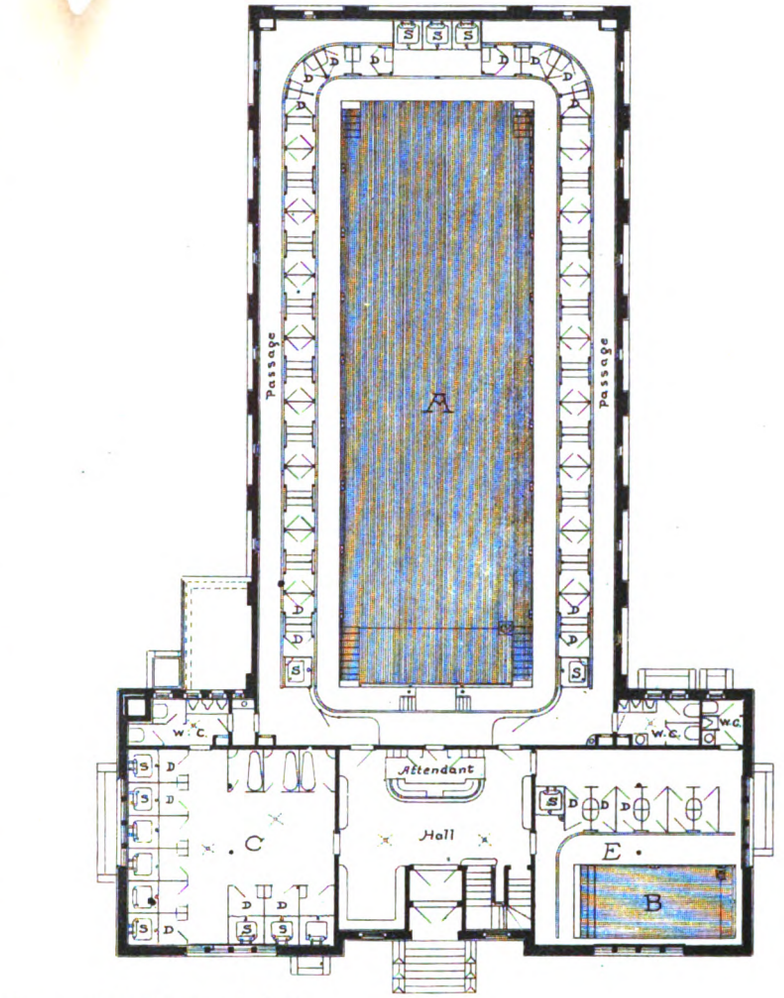
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First Floor Plan.

A - Swimming Bath
B C E - Plunge Bath, Private Bath, Swimming School
D - Dressing Rooms
S - Rain Baths.

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INTERIOR OF SWIMMING BATH



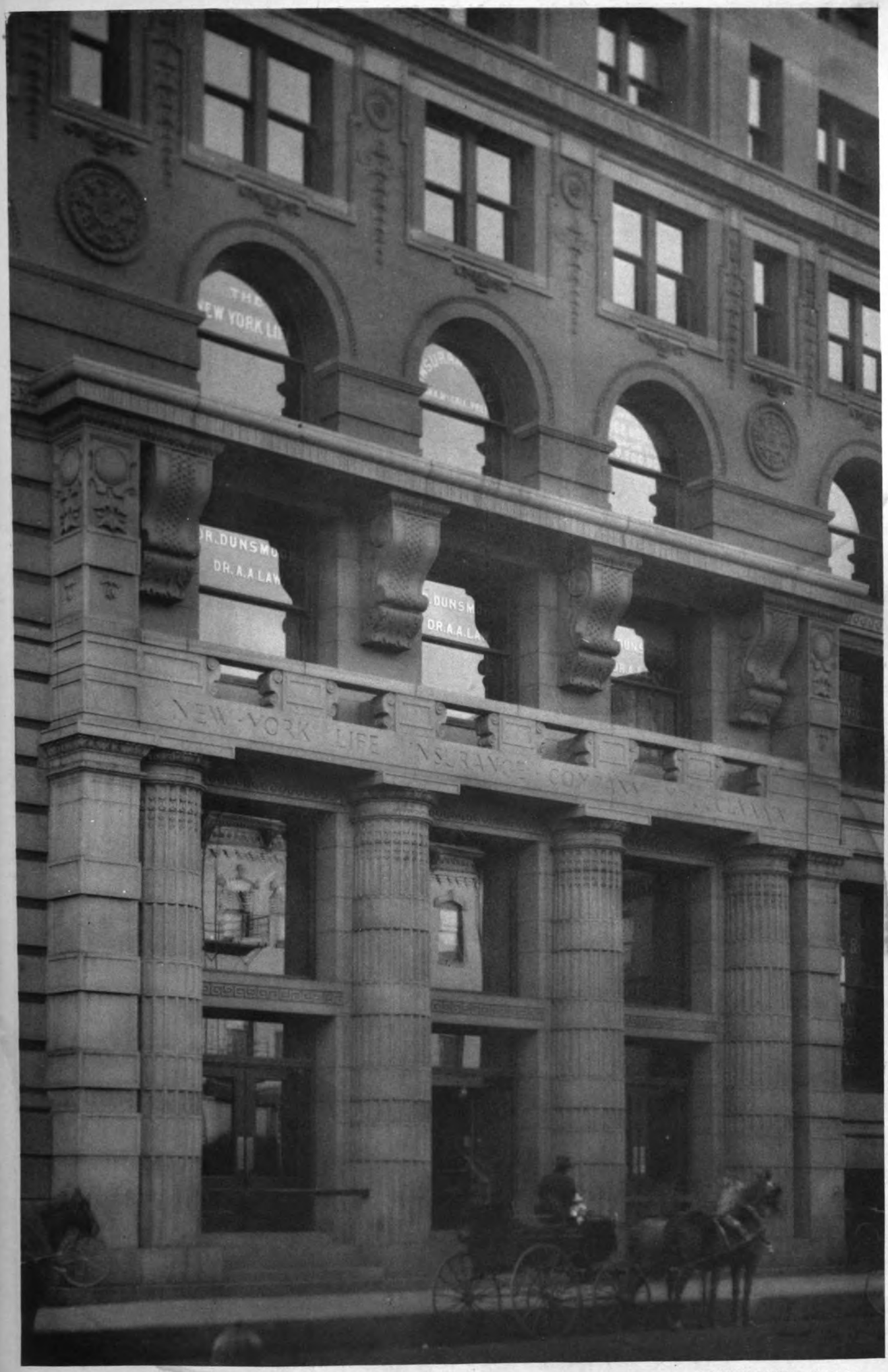
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F. JOSEPH UNTERSEE, ARCHITECT
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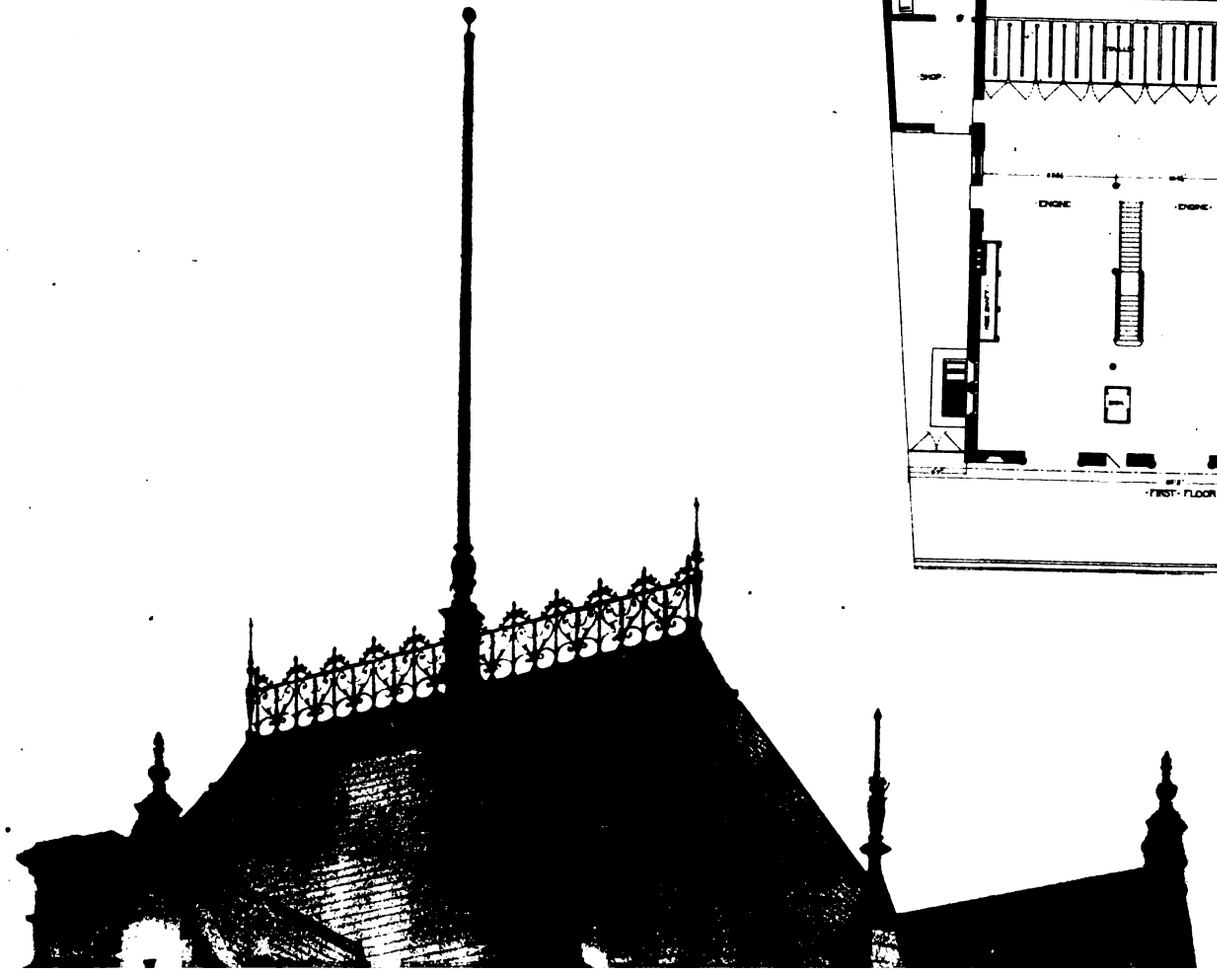
BABB, COOK & WILLARD, Architects.

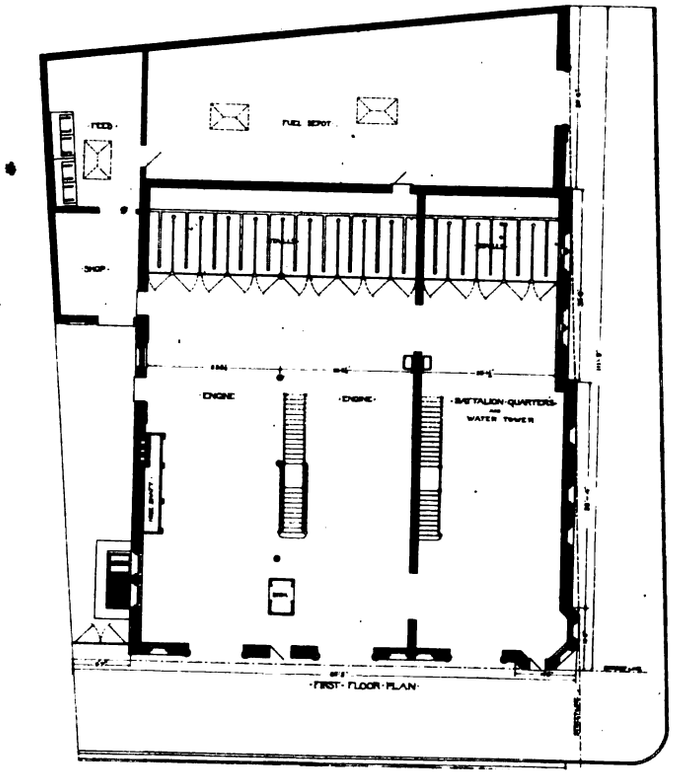
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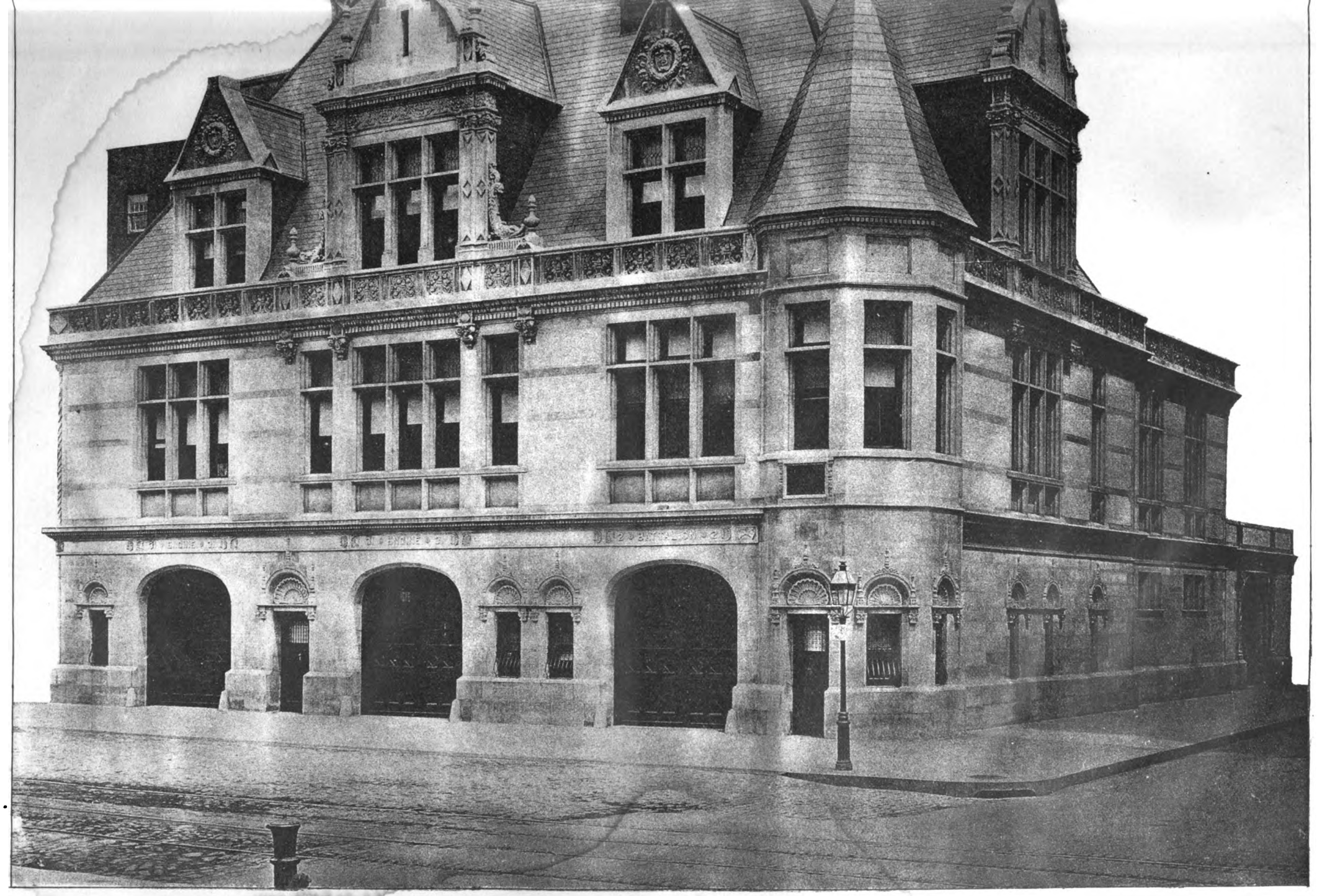
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ENGINE-HOUSE AND BATTALION QUARTERS, NEW YORK FIRE DEPARTMENT,
CORNER ELM AND WHITE STREETS.

N. J. P. Bruin & Sons, Architects.

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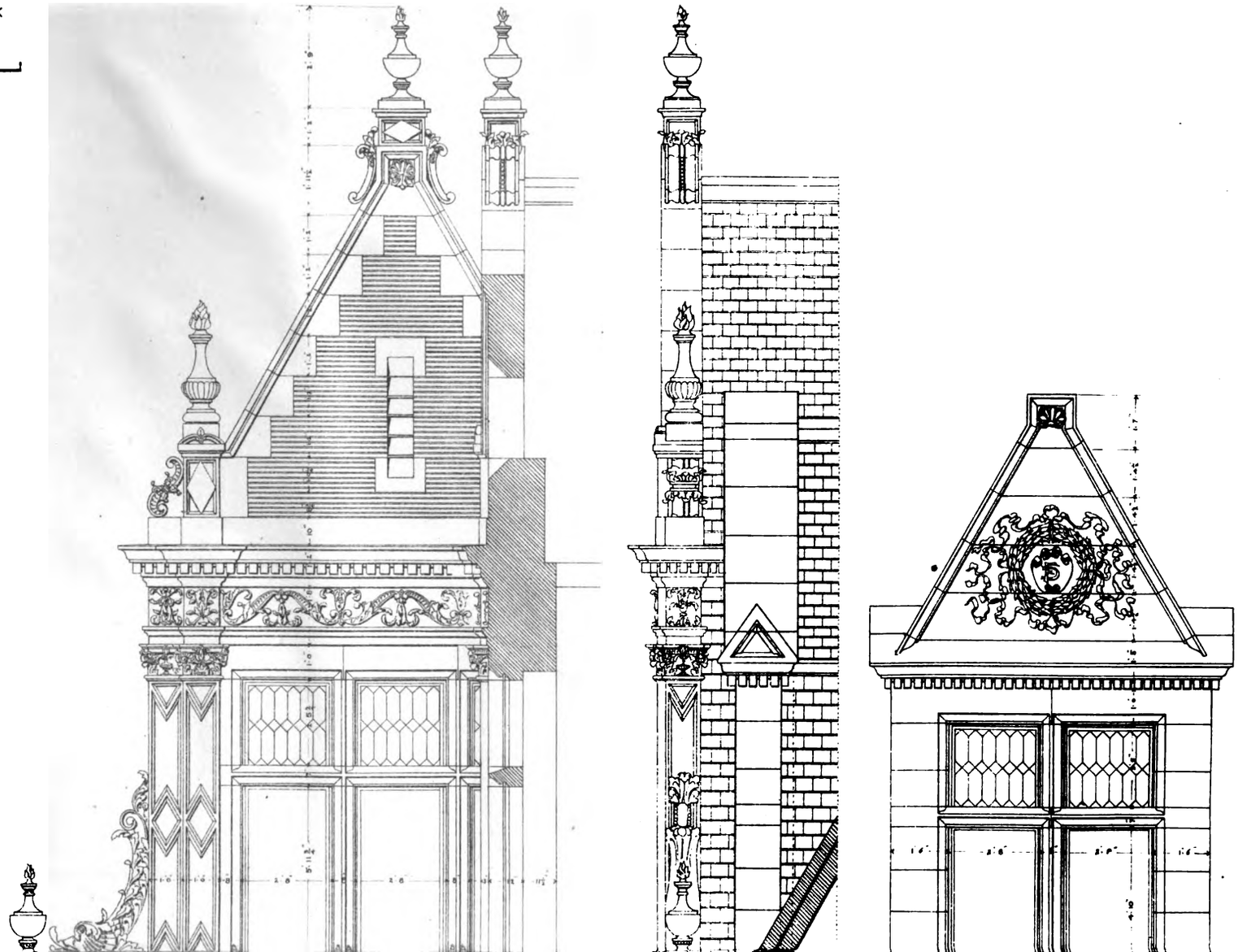
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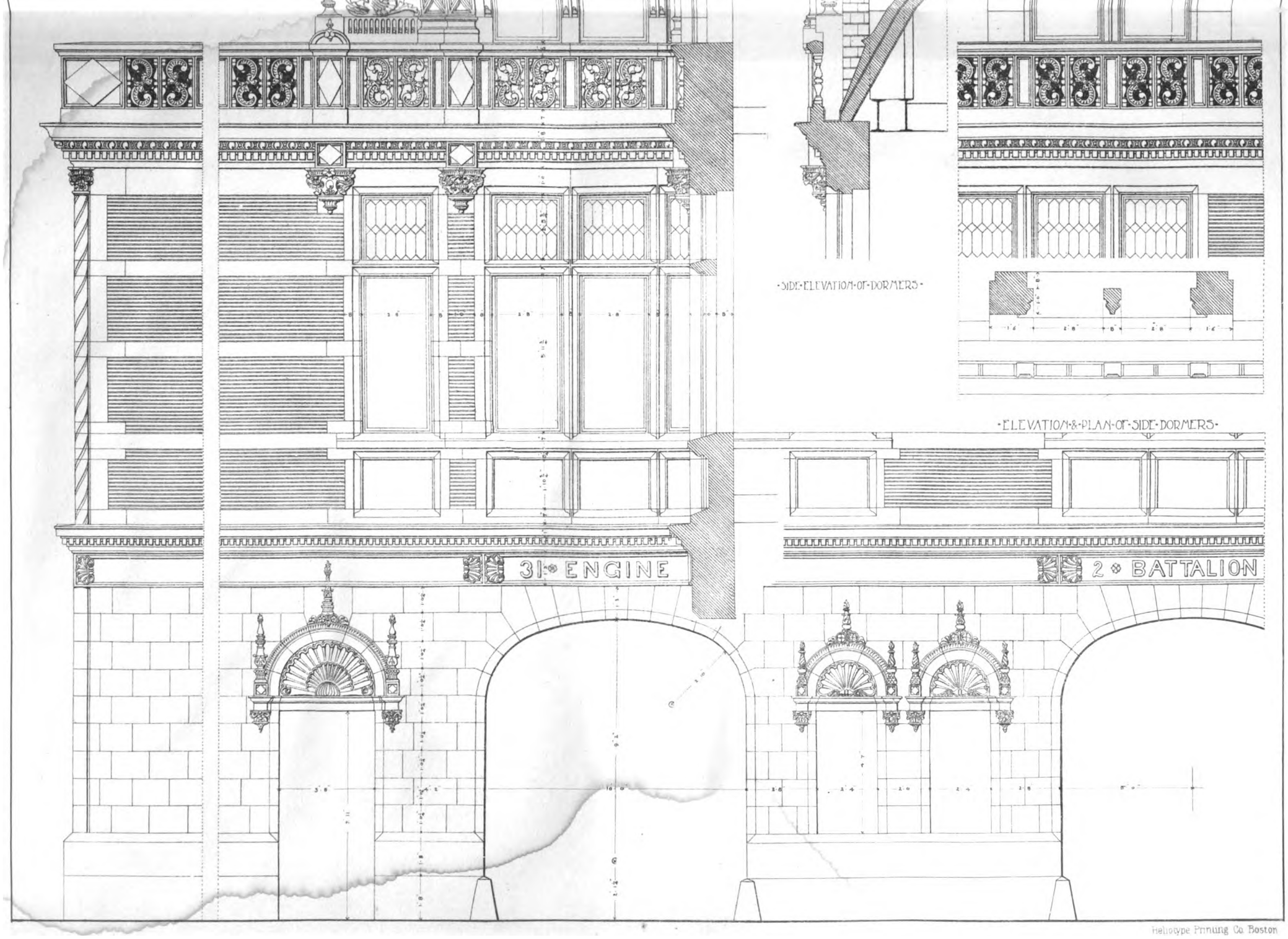
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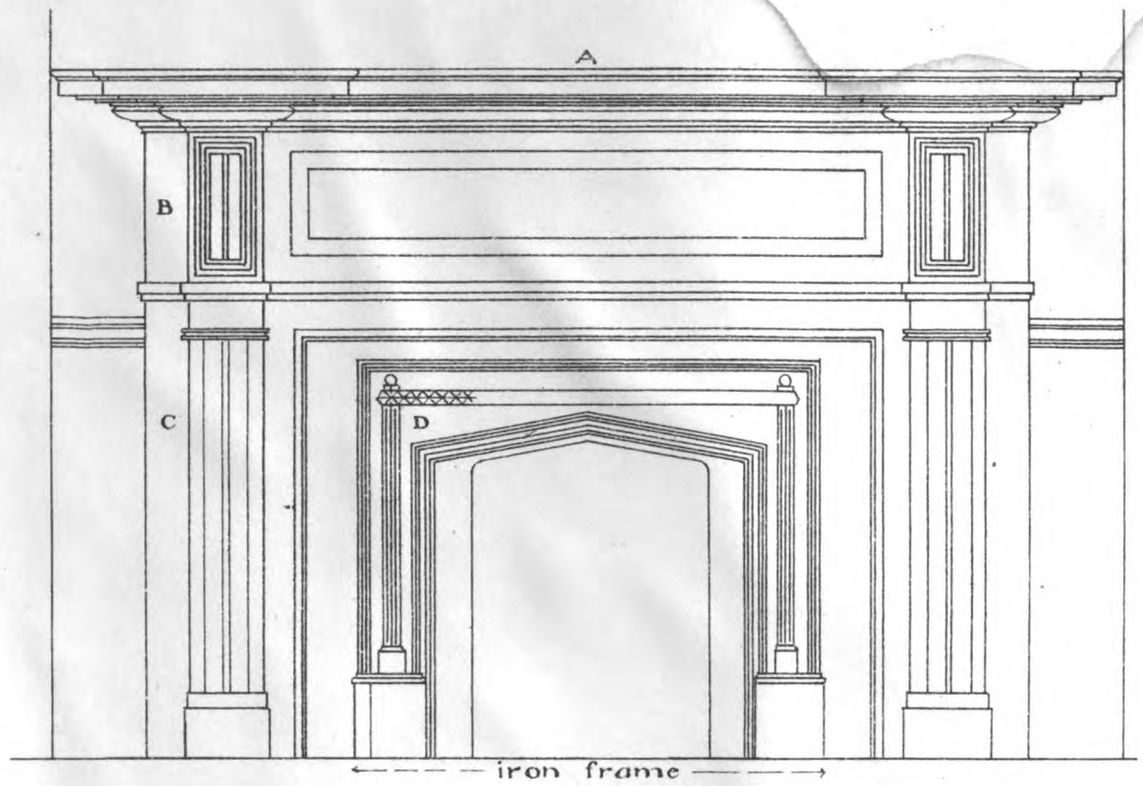
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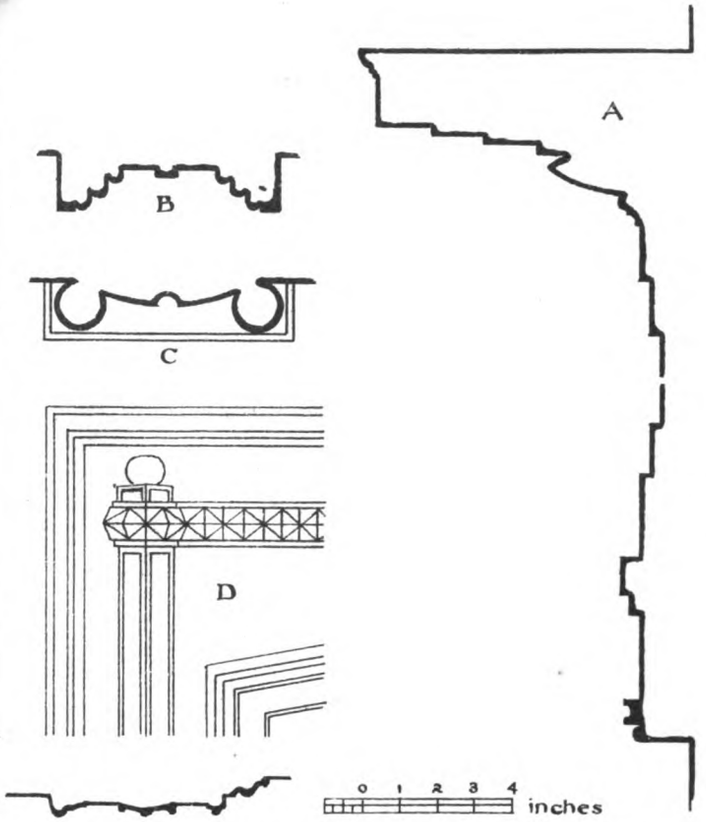
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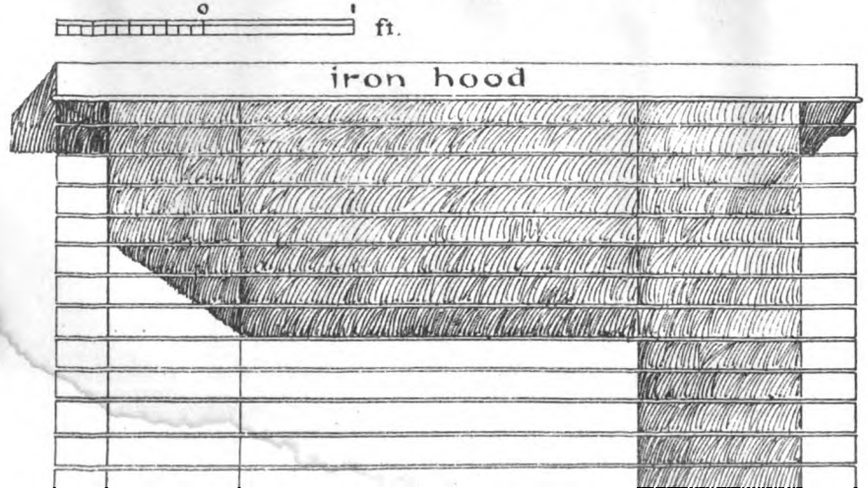
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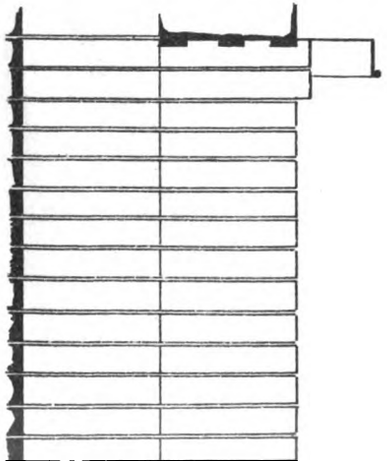
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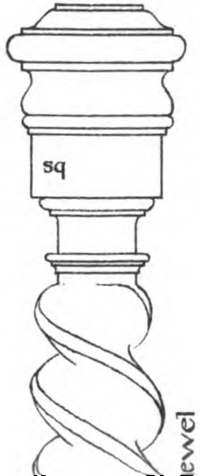


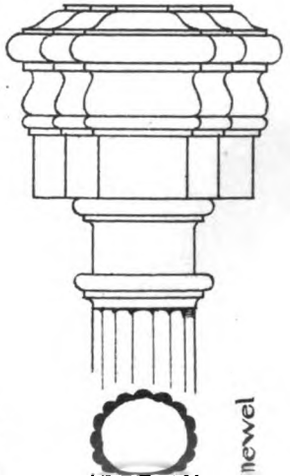


Dining Room Mantel

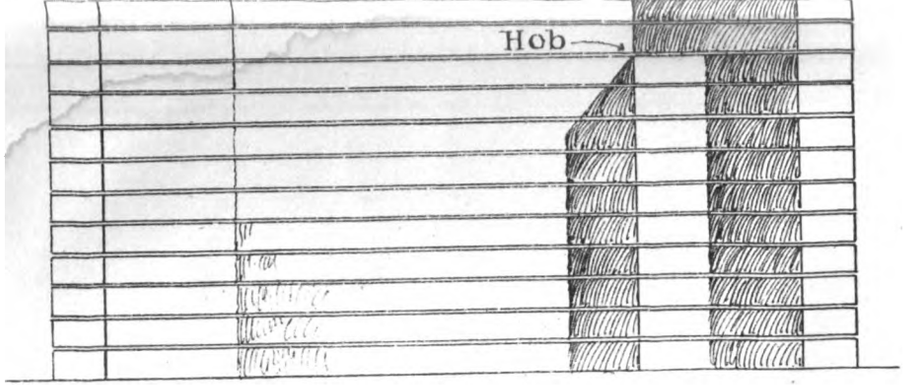






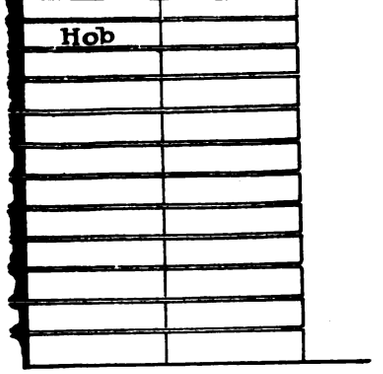


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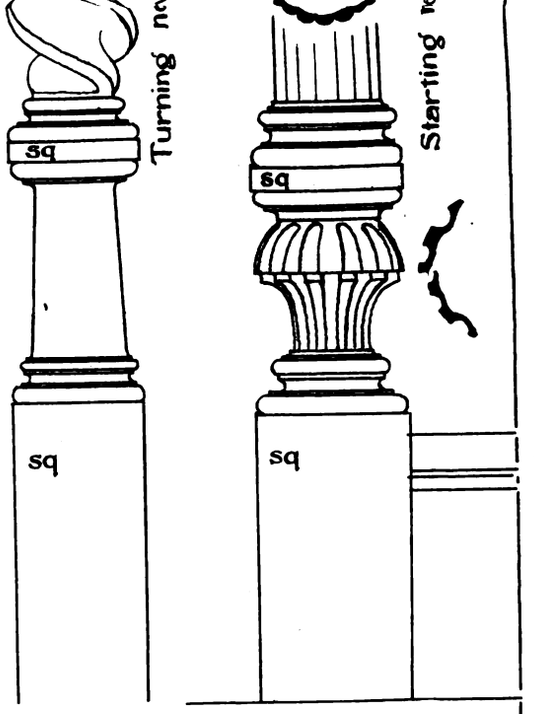


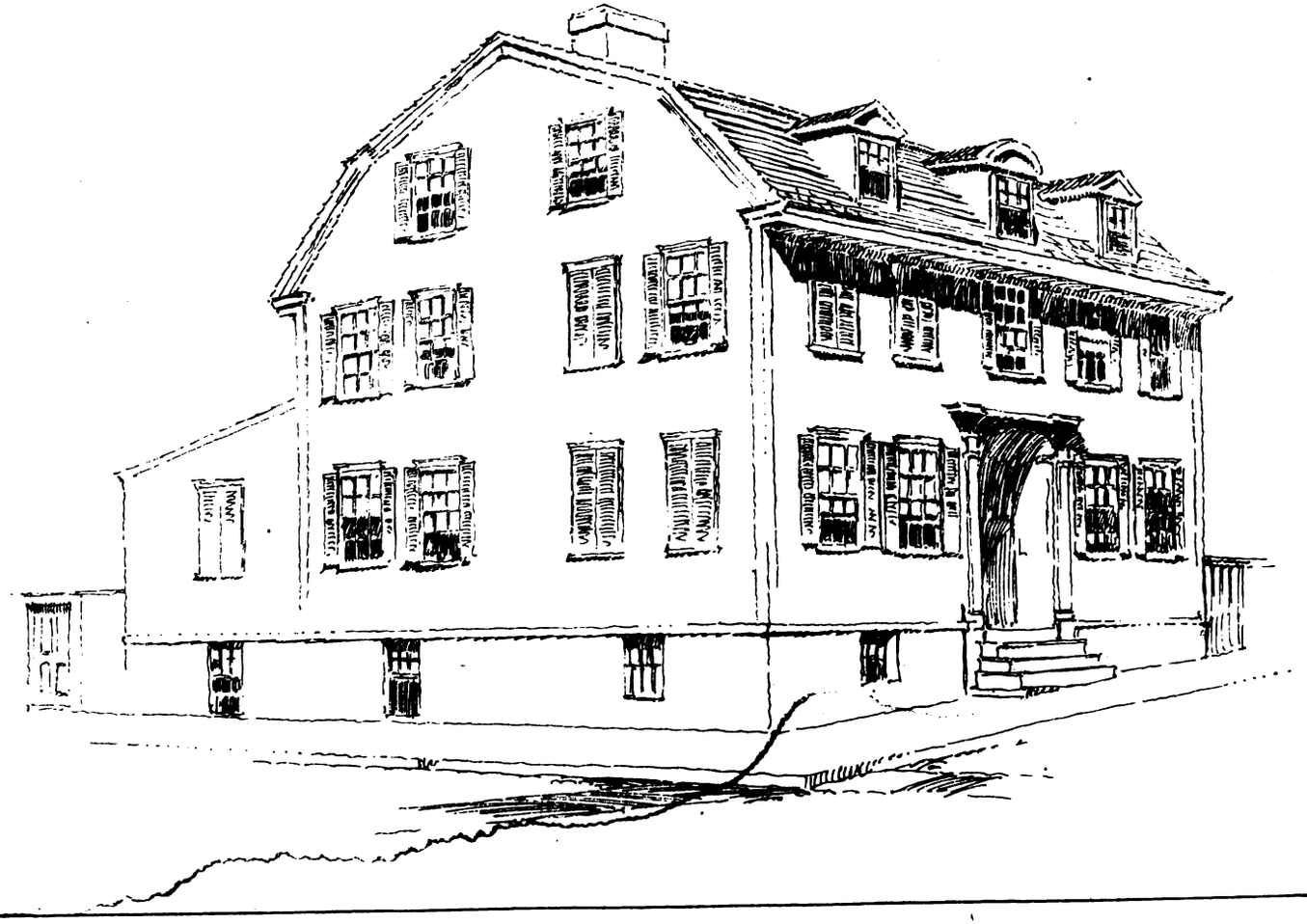


Kitchen Fireplace



Section





Sayer House, Newport, R.I.

I

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THE JOHN BOYLE O'REILLY MONUMENT, BACK BAY FENS, BOSTON, MASS.

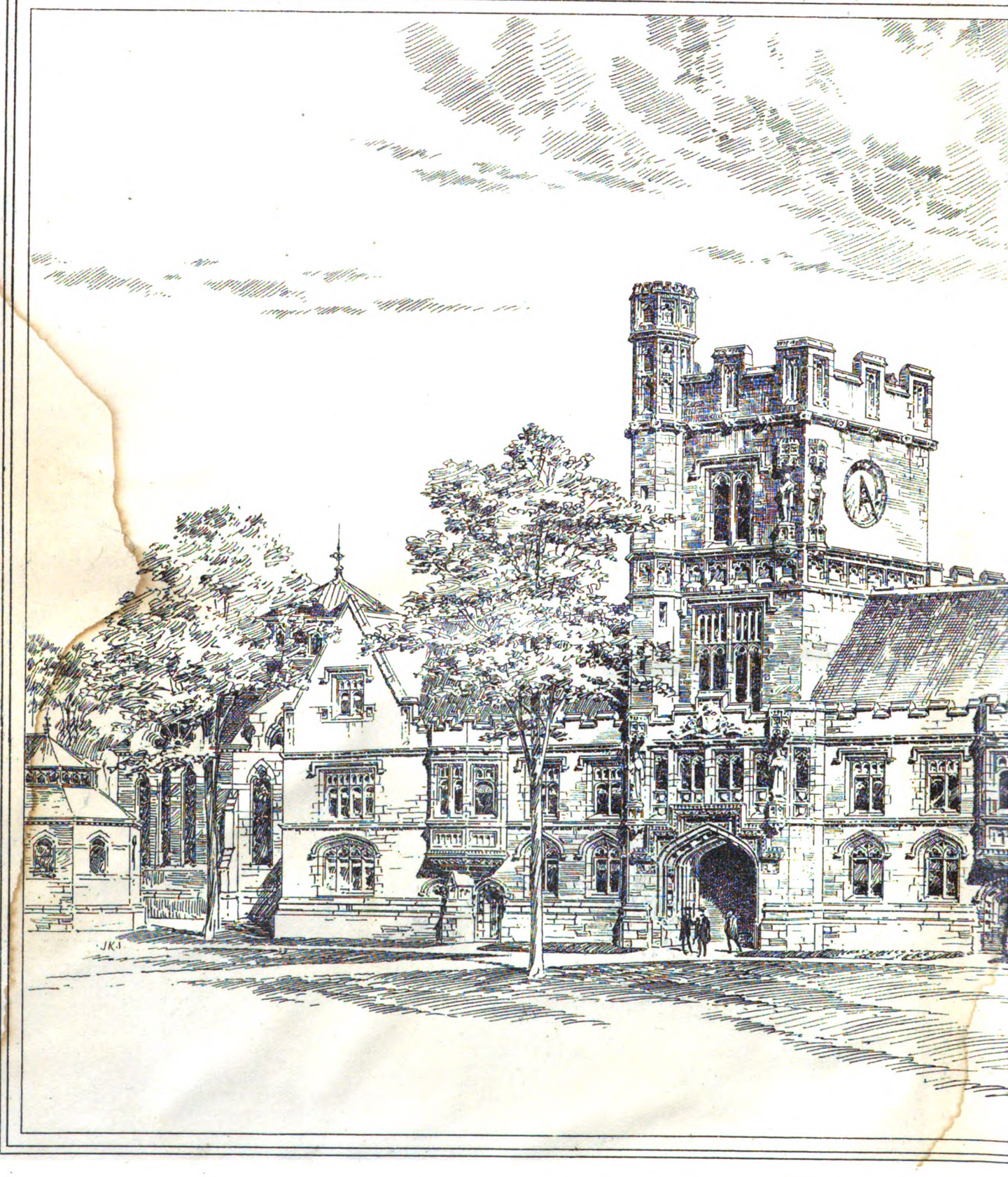
DANIEL C. FRENCH, Sculptor. WALKER & KIMBALL, Architects.

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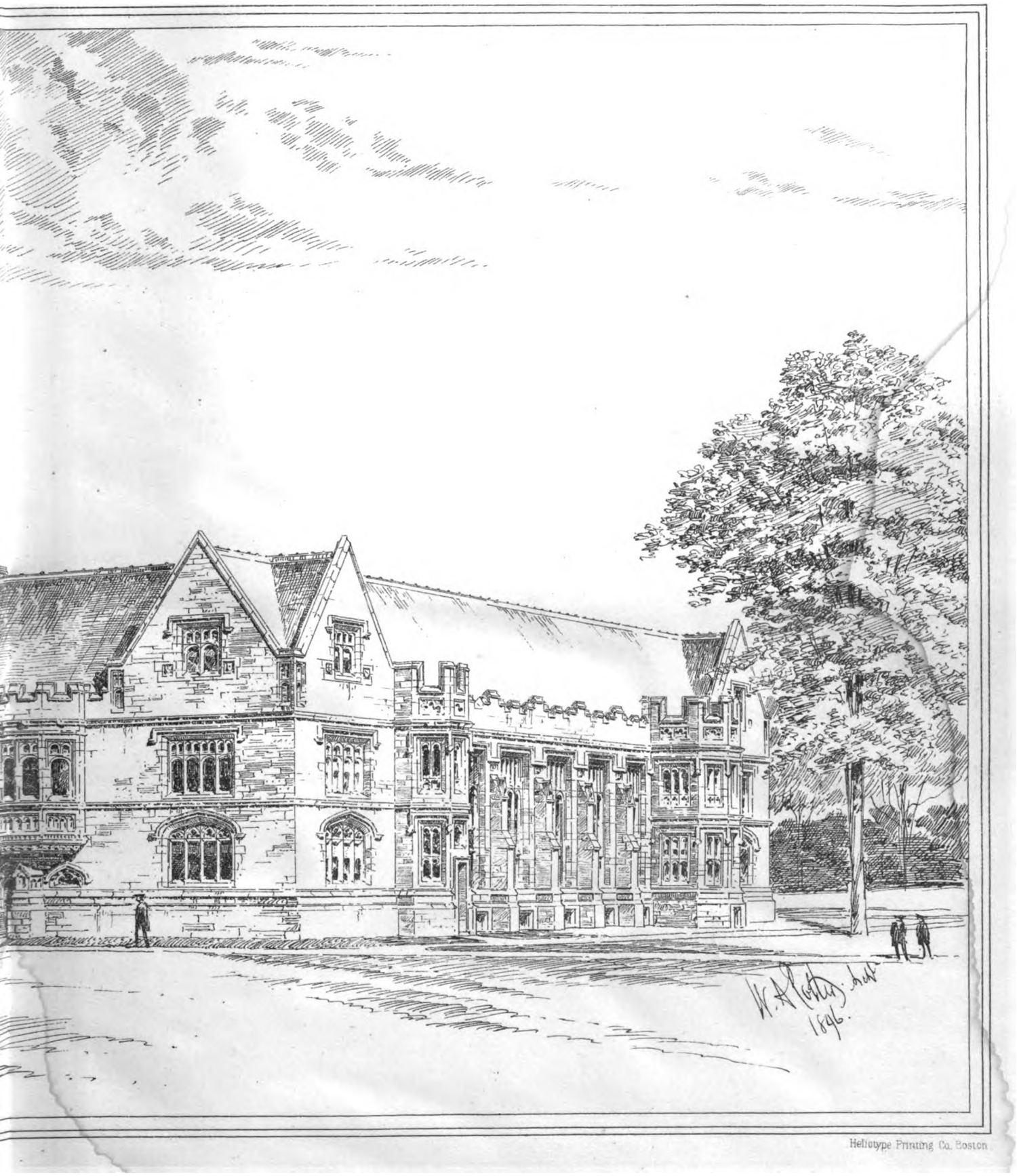


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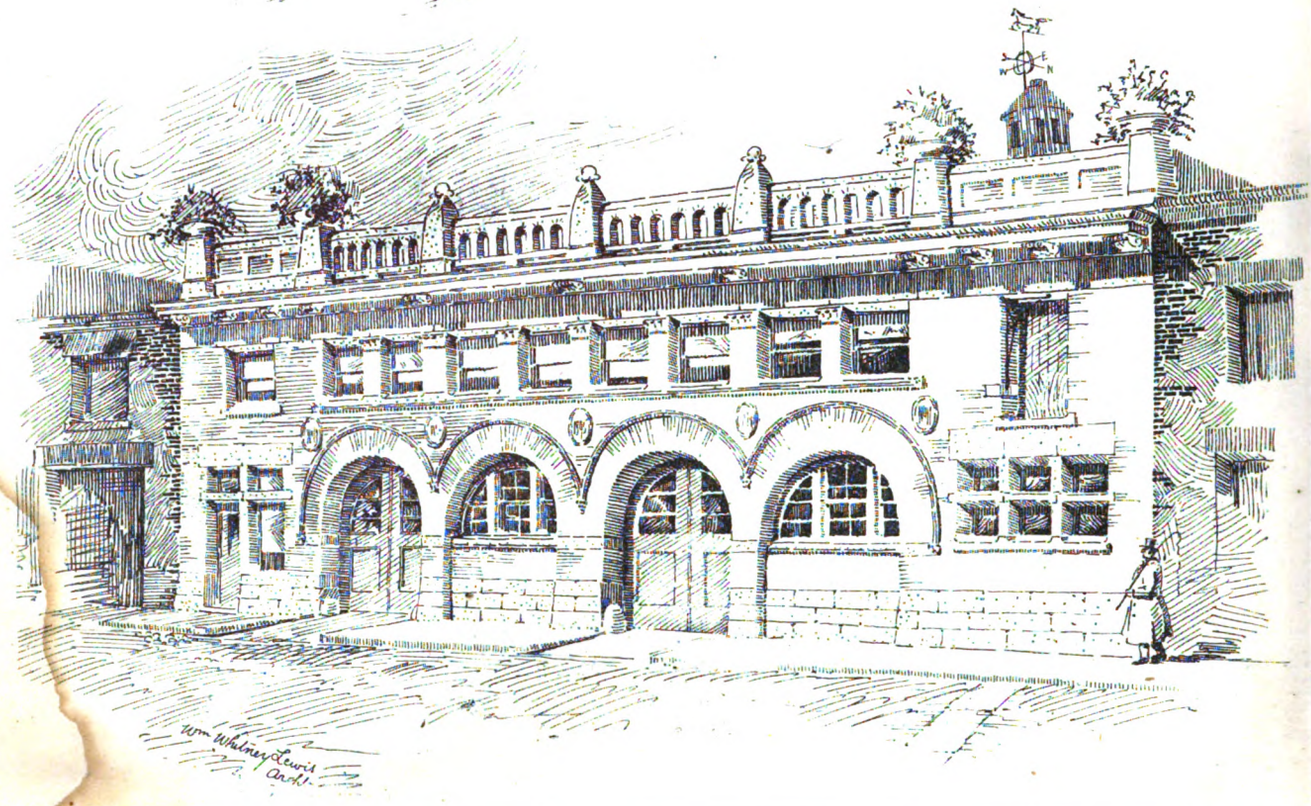
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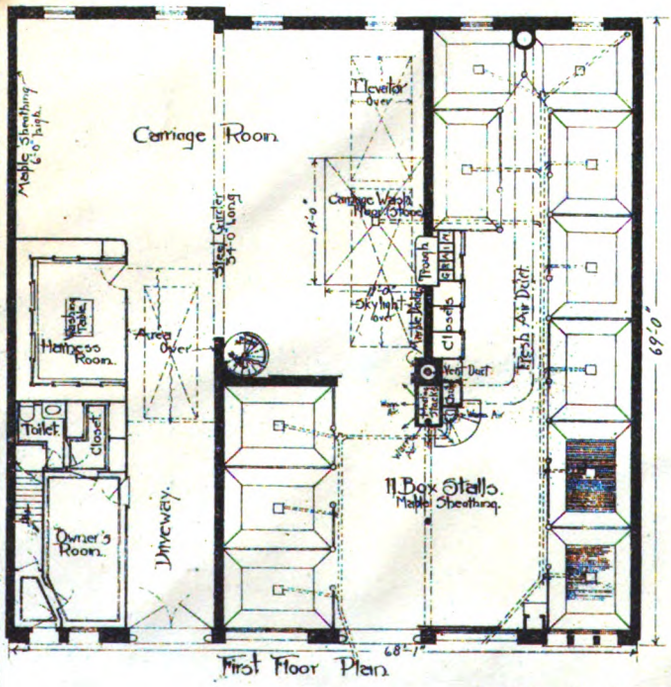


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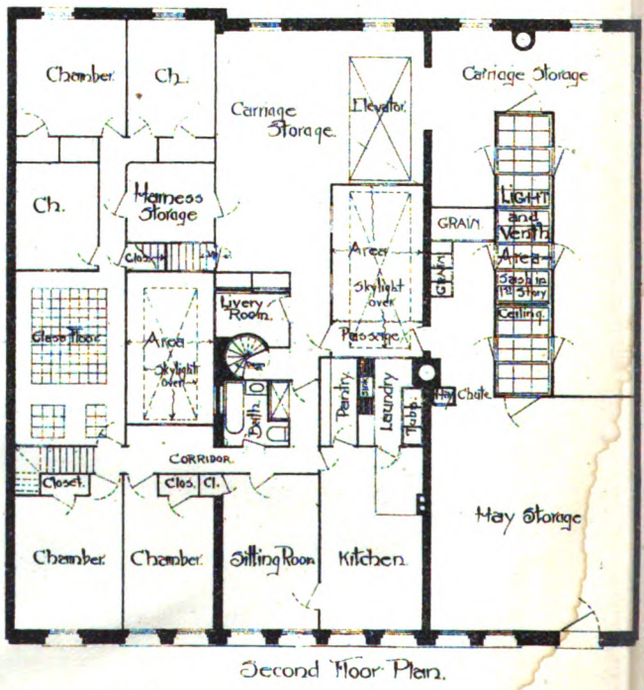
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First Floor Plan.



Second Floor Plan.

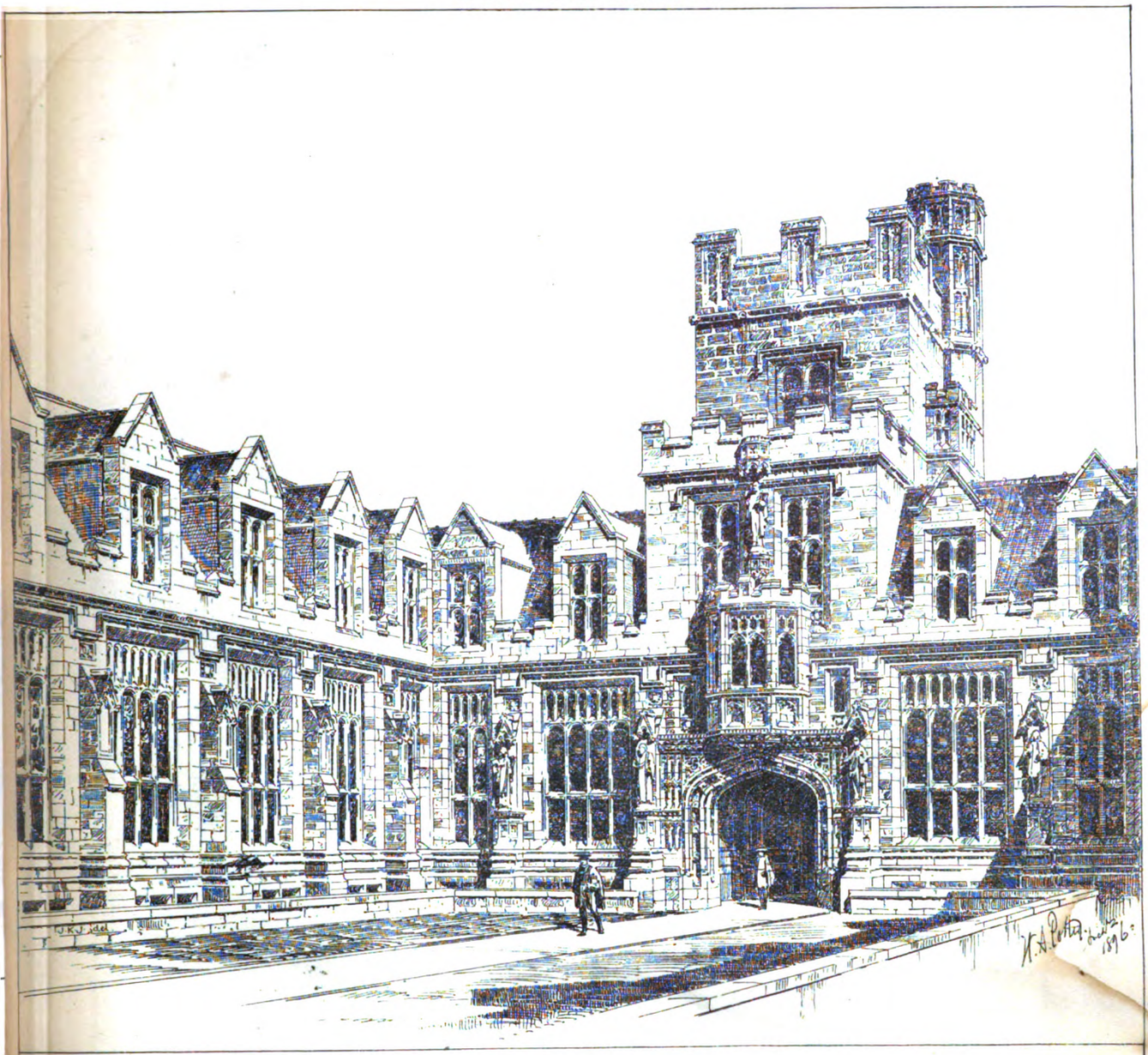
Plans of Stable for Mr Geo. C. Hall.
11-12-13 Byron St. Boston, Mass.
Wm. Whitney Lewis, Archt.

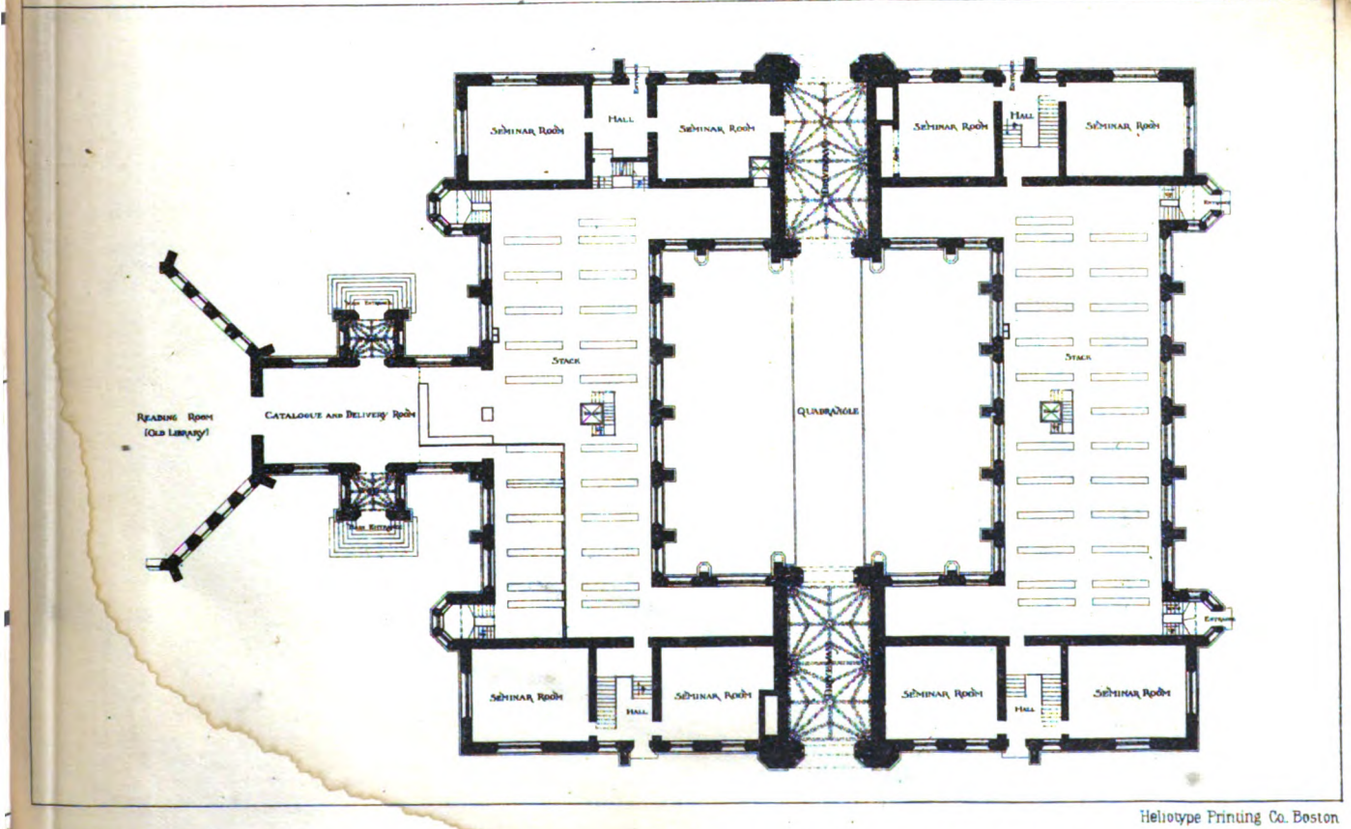
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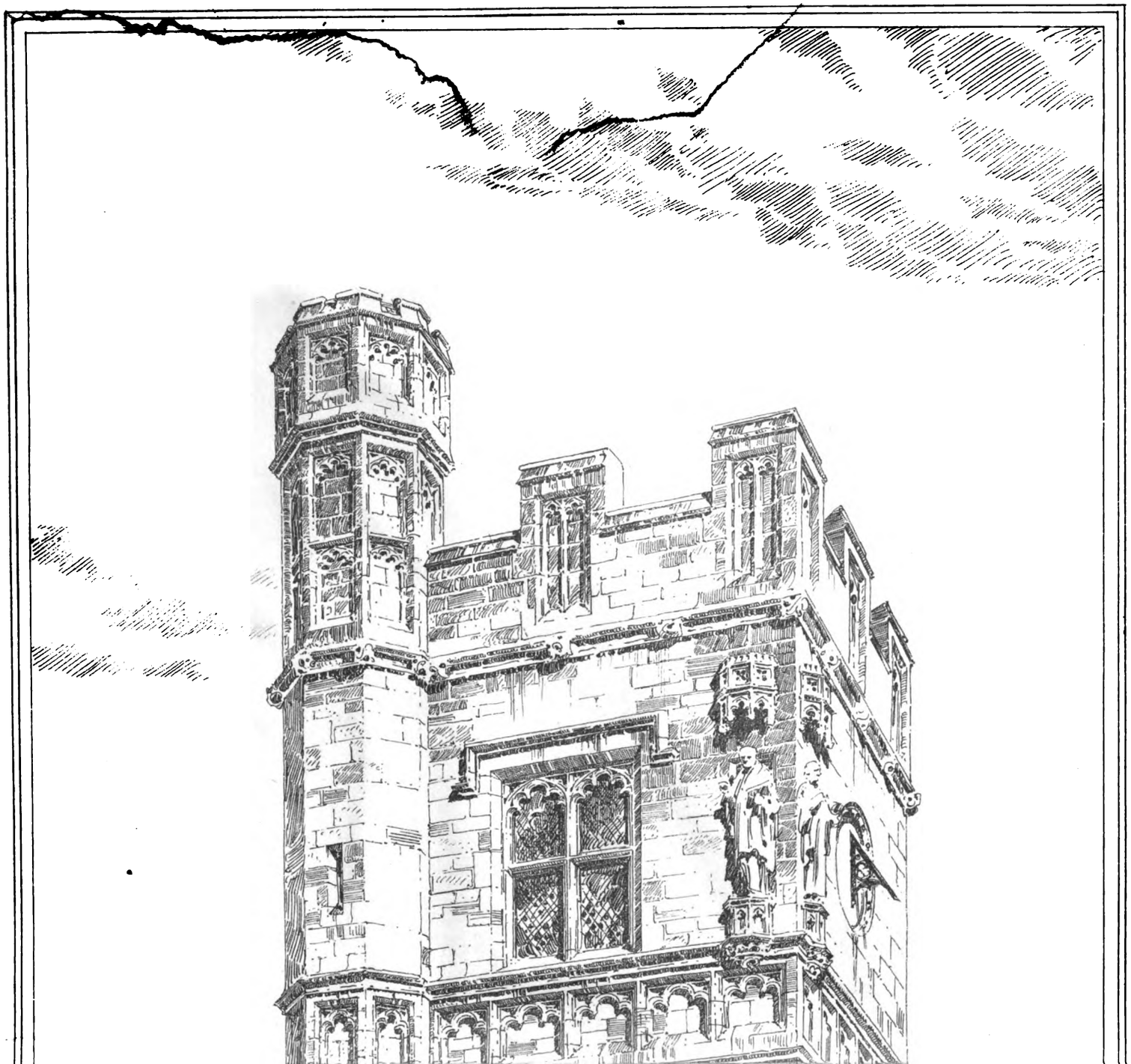
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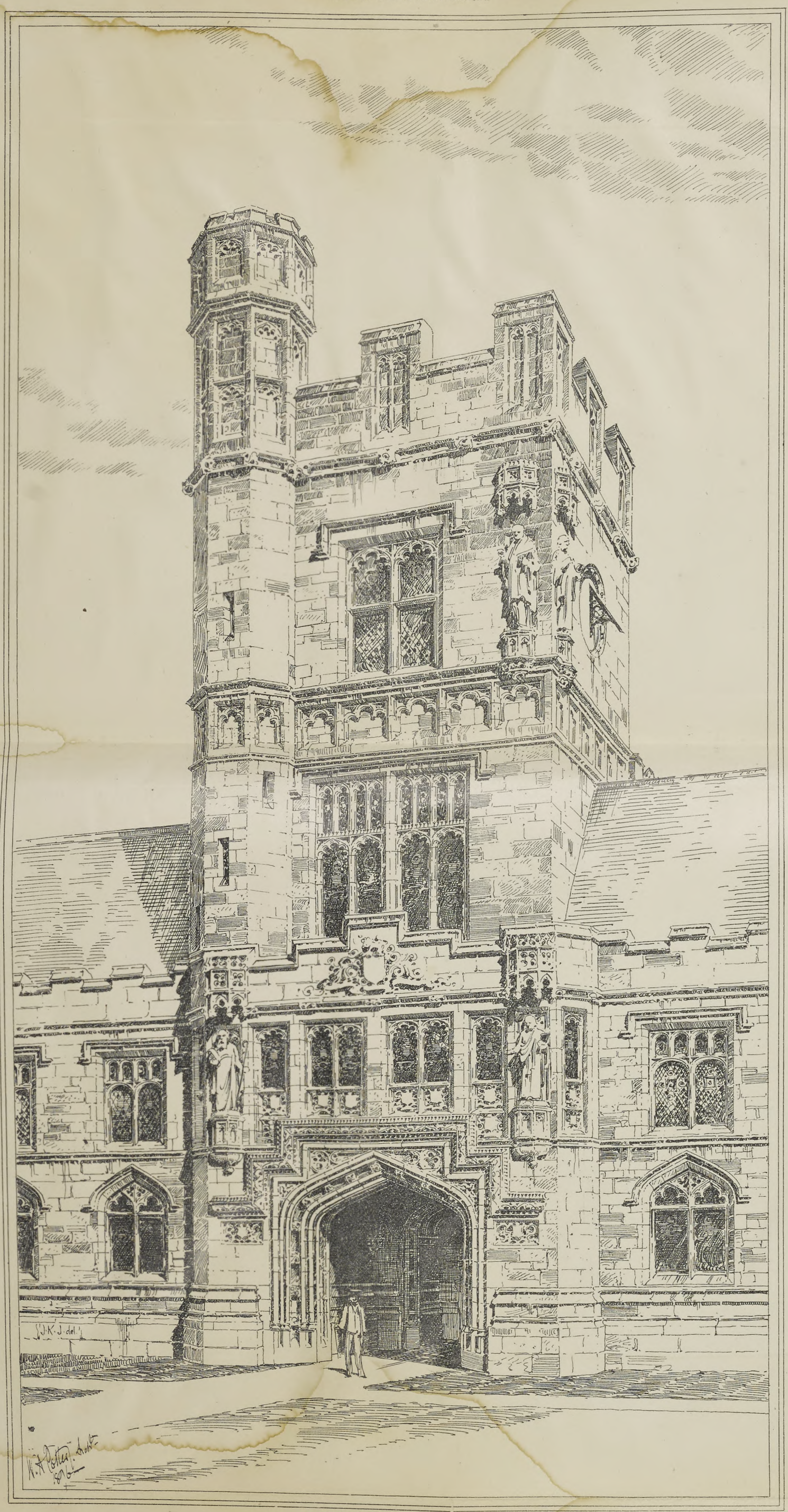
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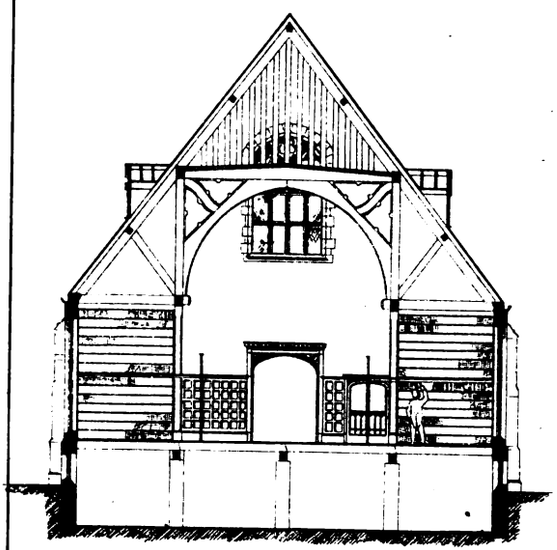
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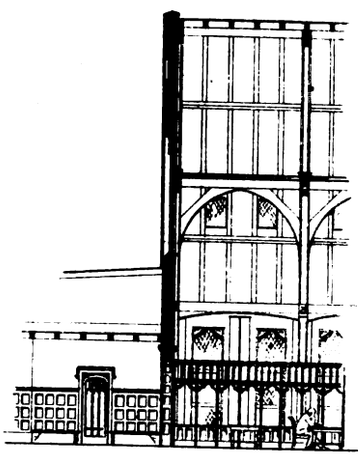


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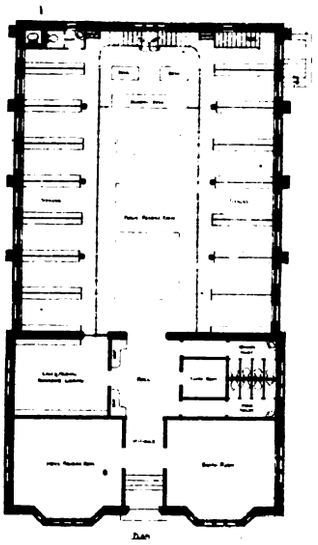
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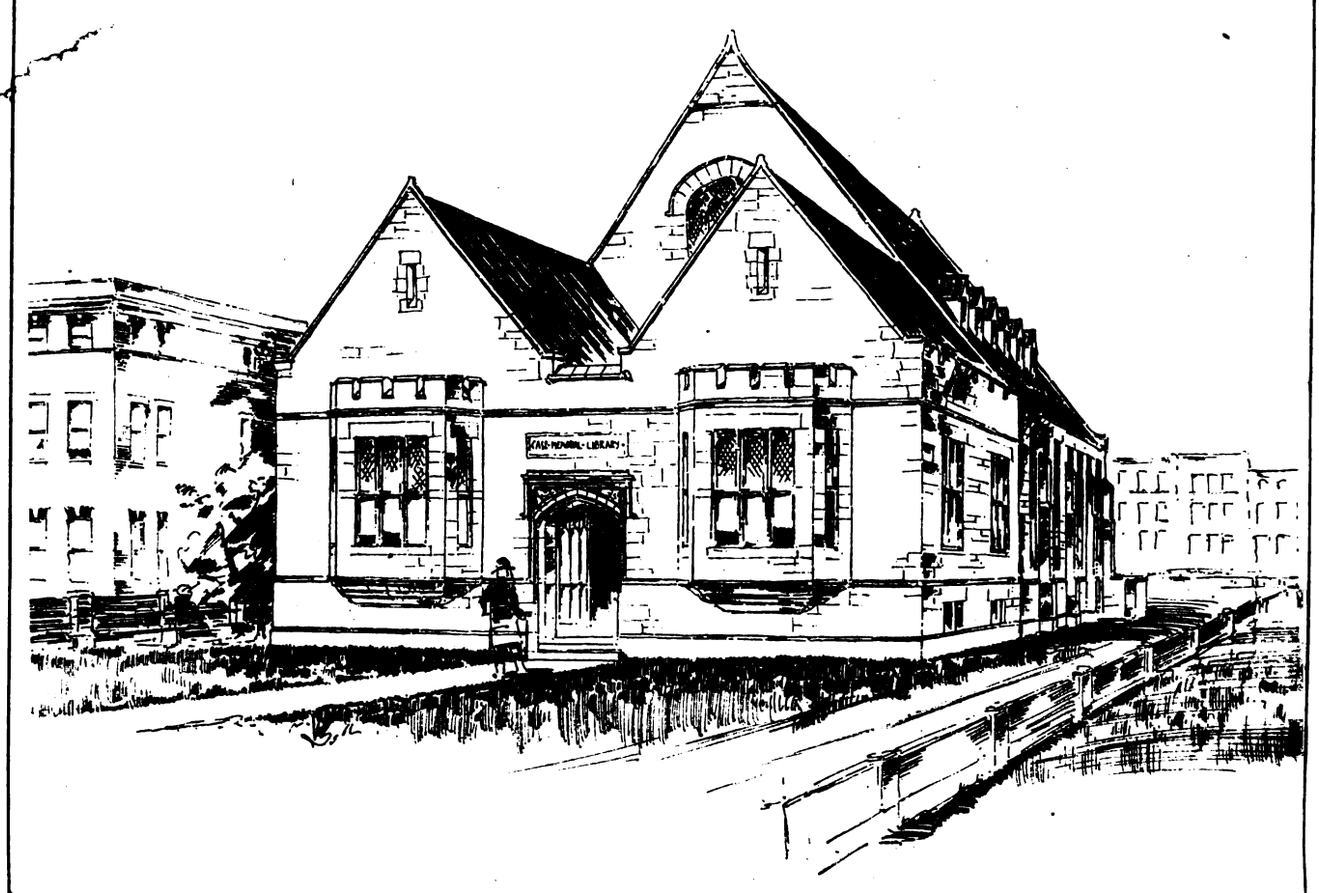


TRANSVERSE SECTION
LOOKING NORTH



LONGITUDINAL SECTION
LOOKING EAST





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O. OSTERBERG, Architect.

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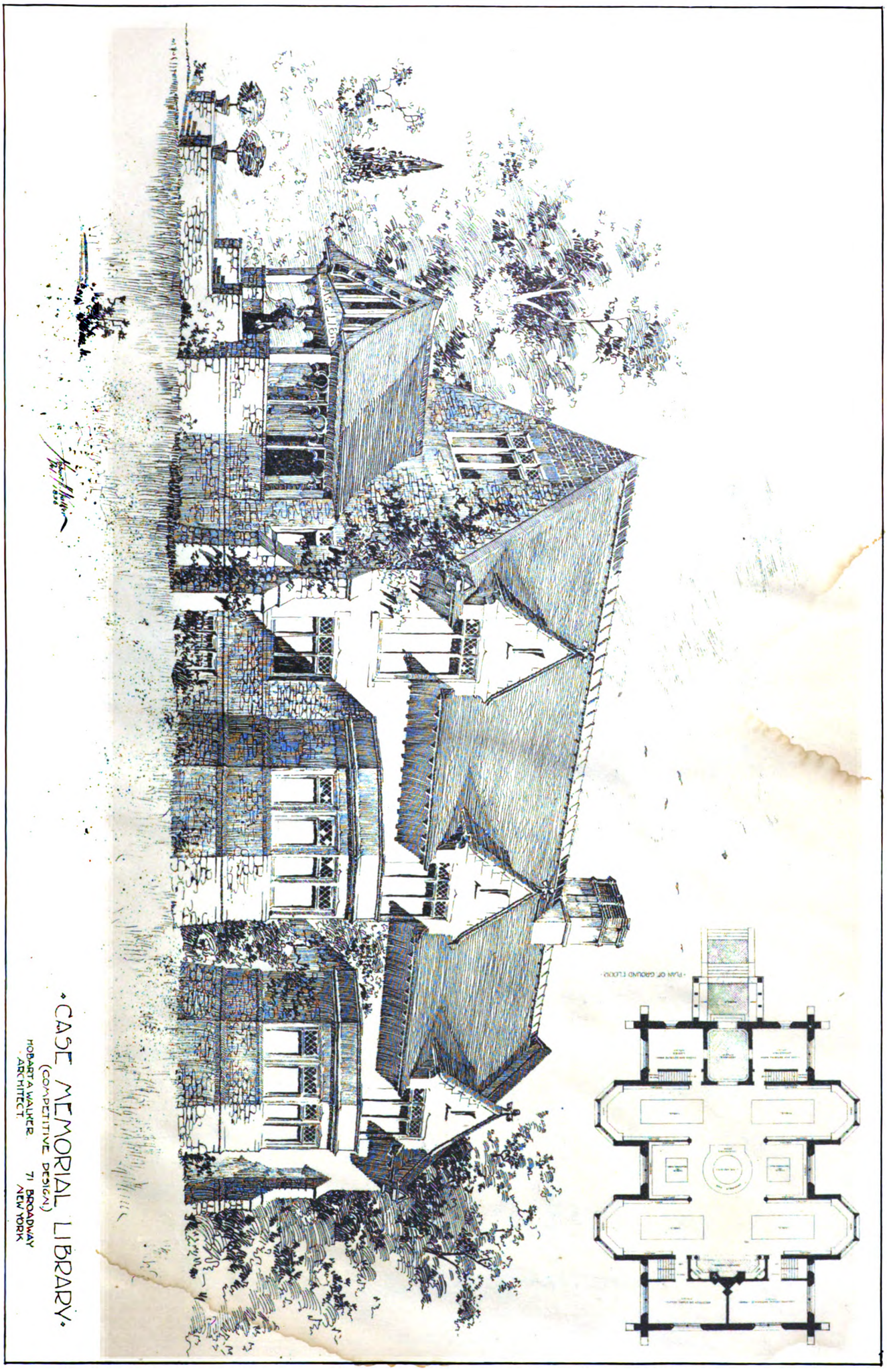
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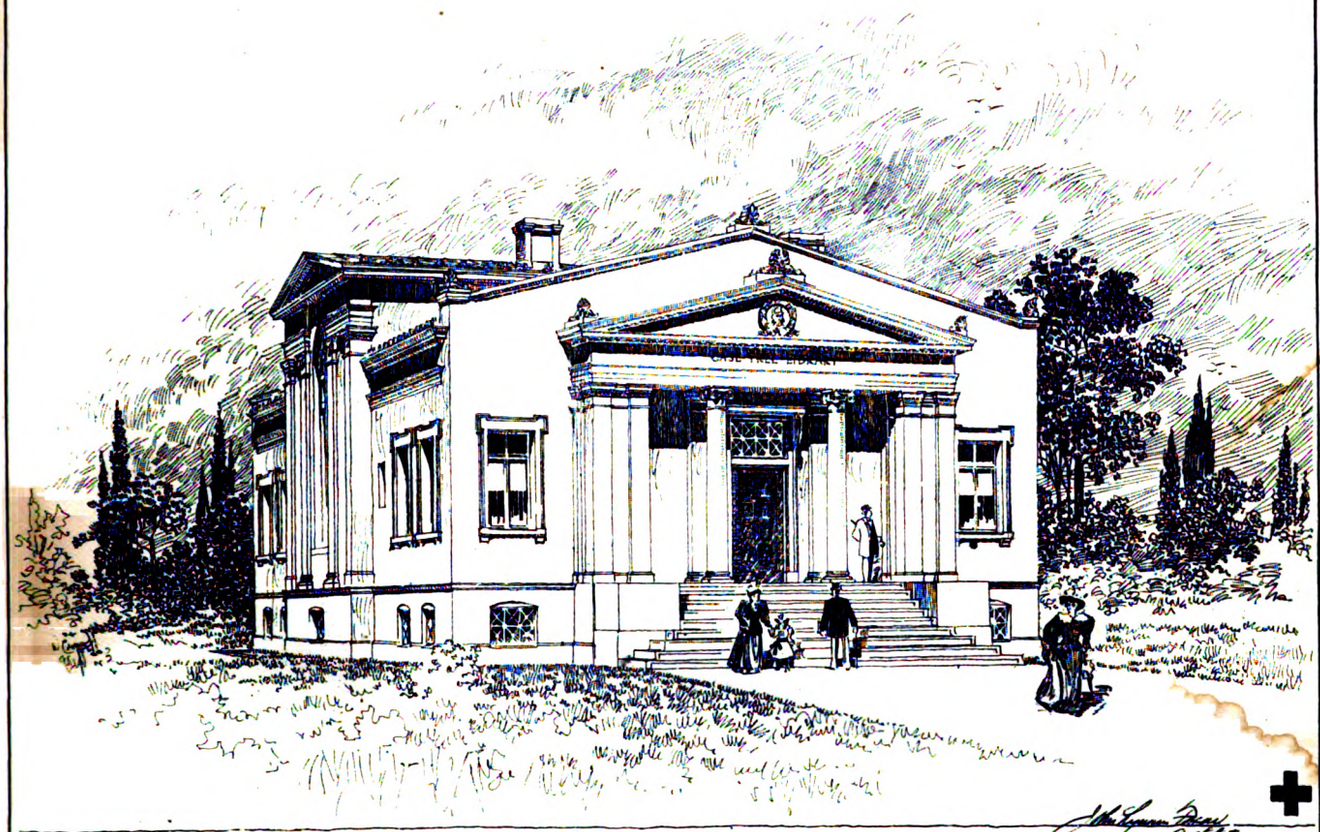
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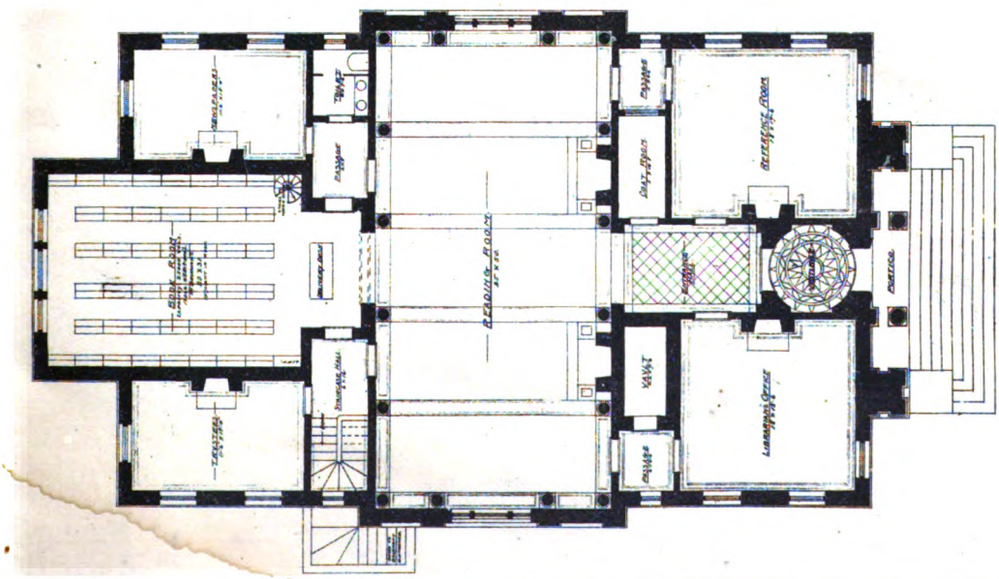


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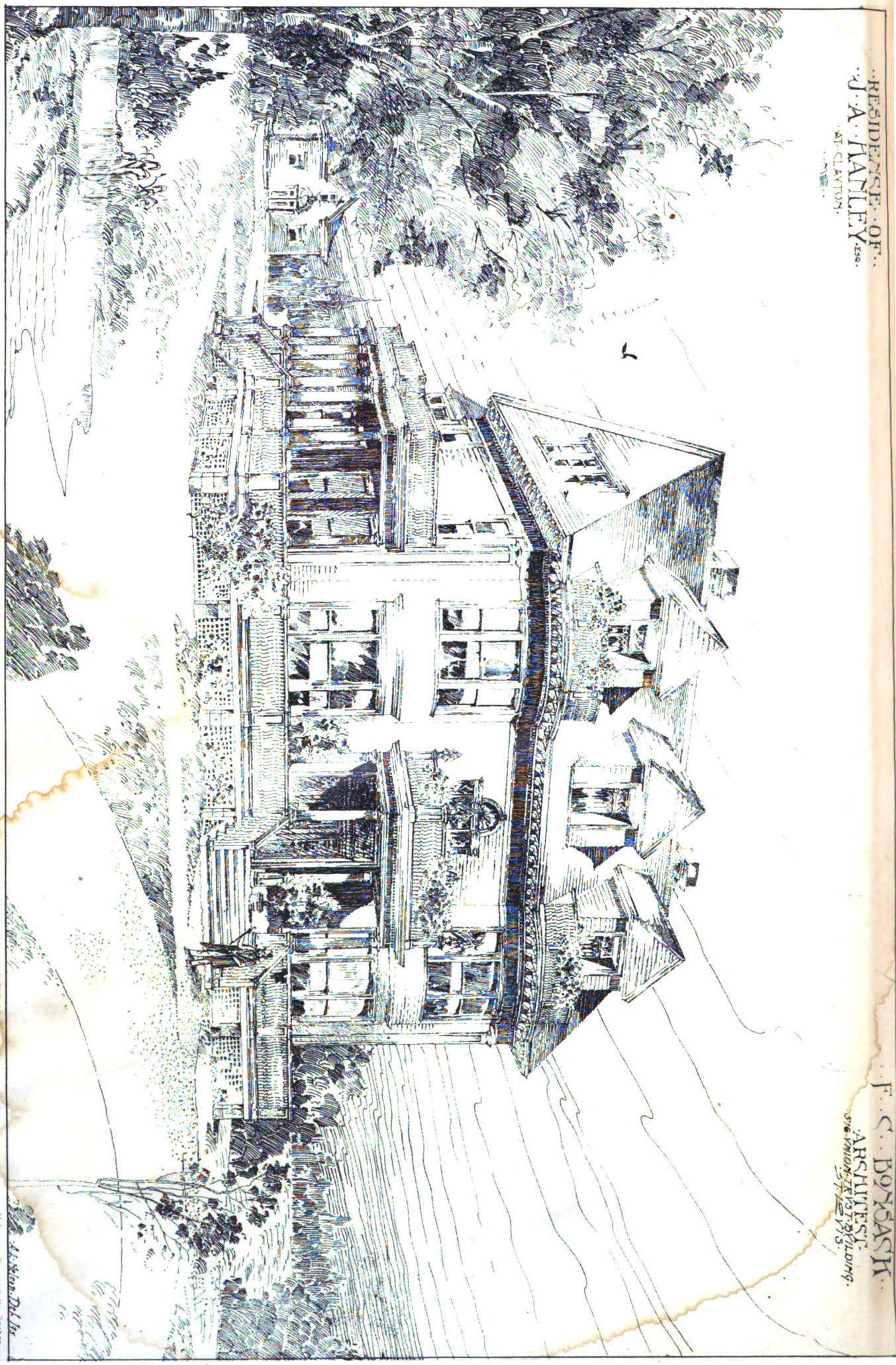
JOHN LYMAN FAXON, Architect.

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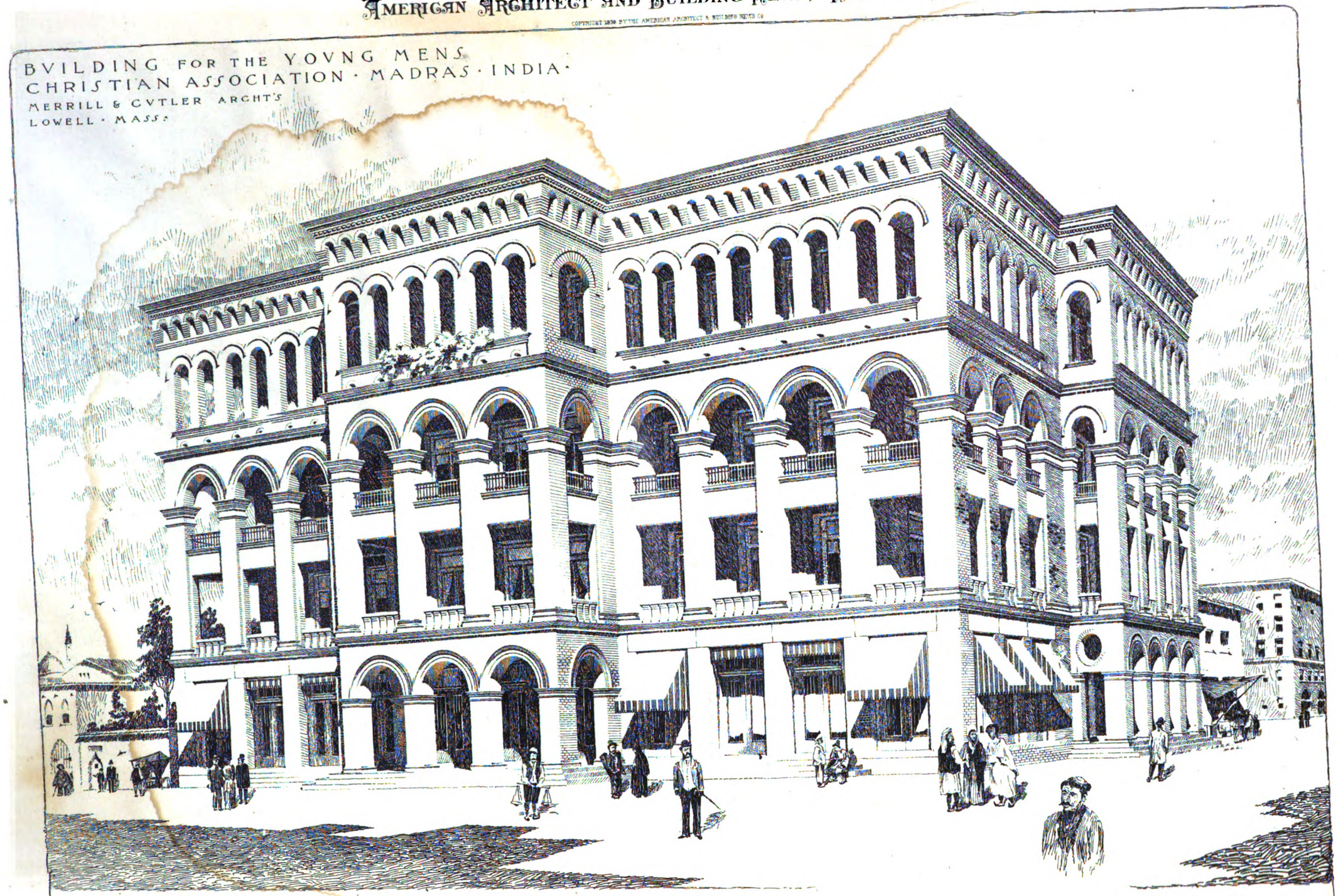
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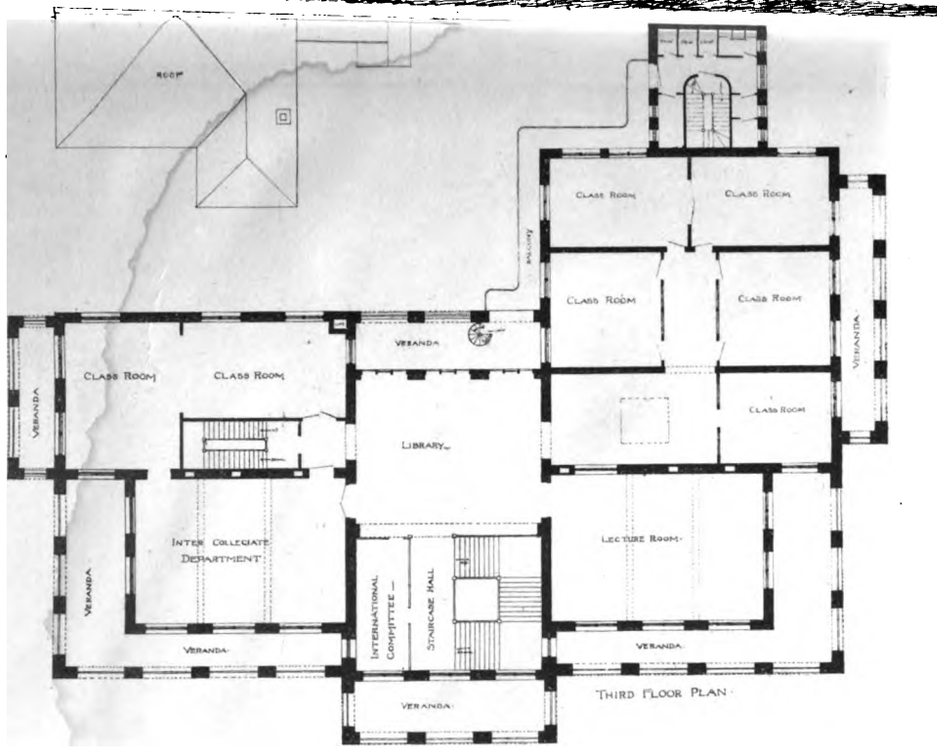
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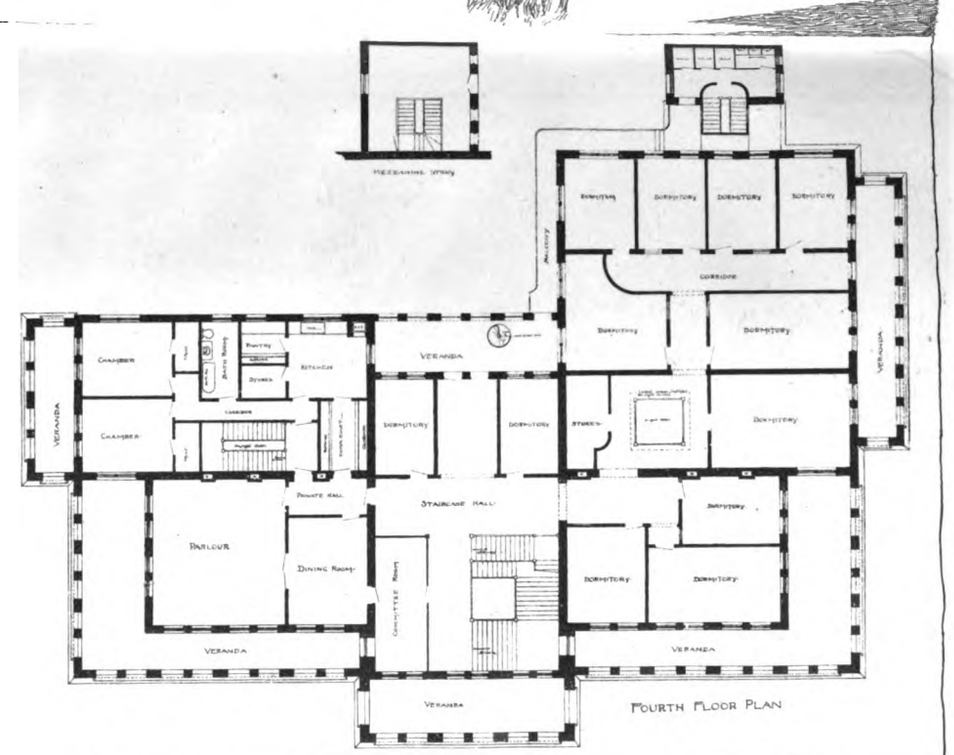
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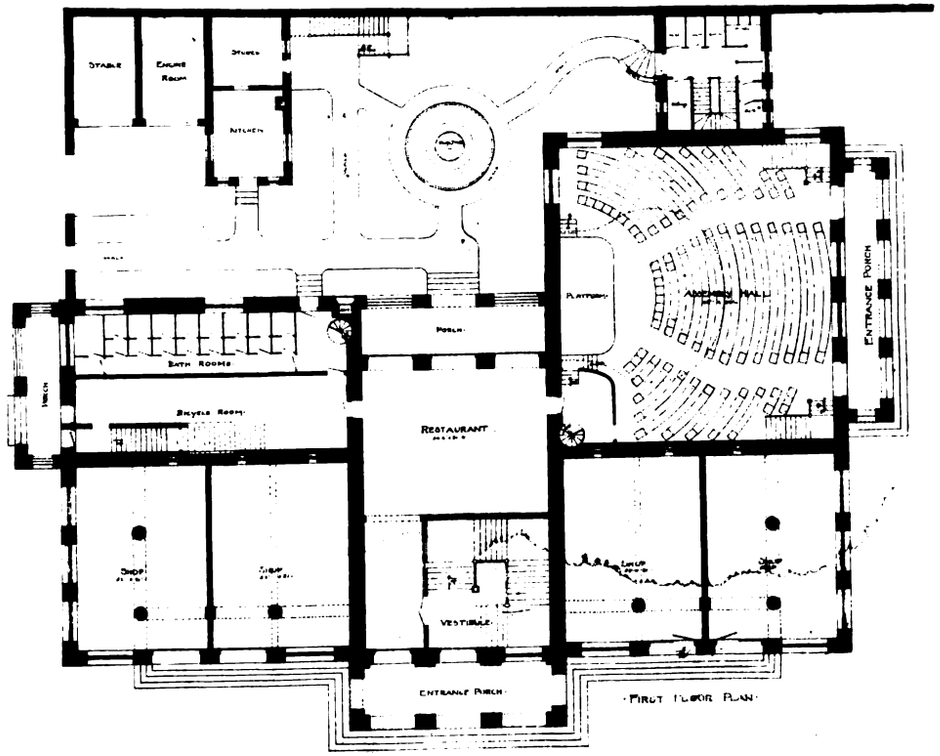
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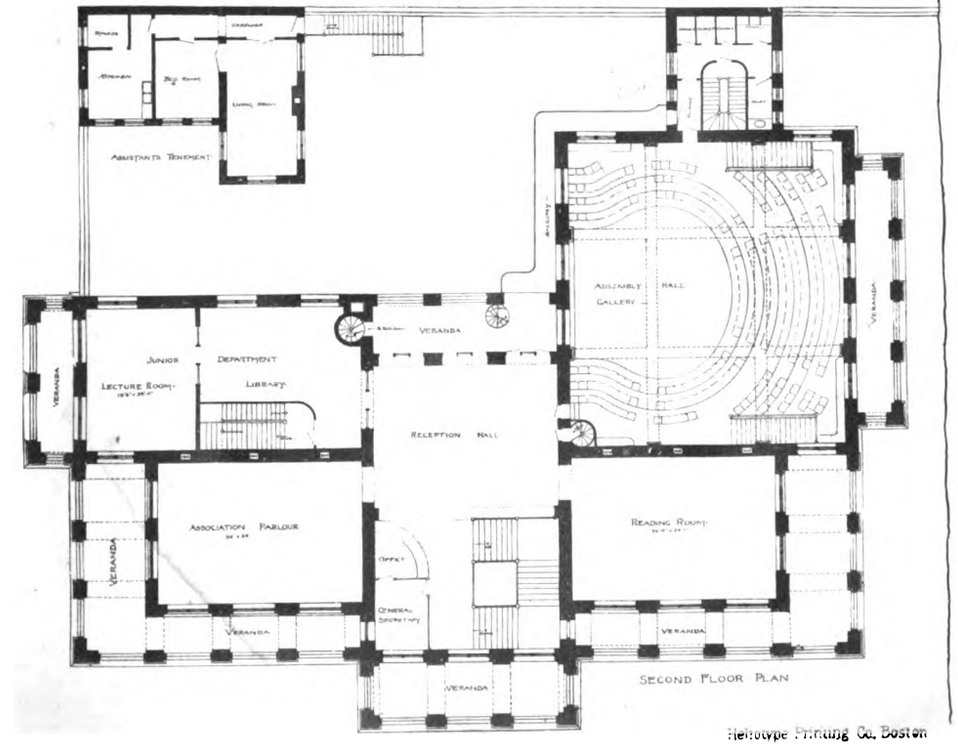


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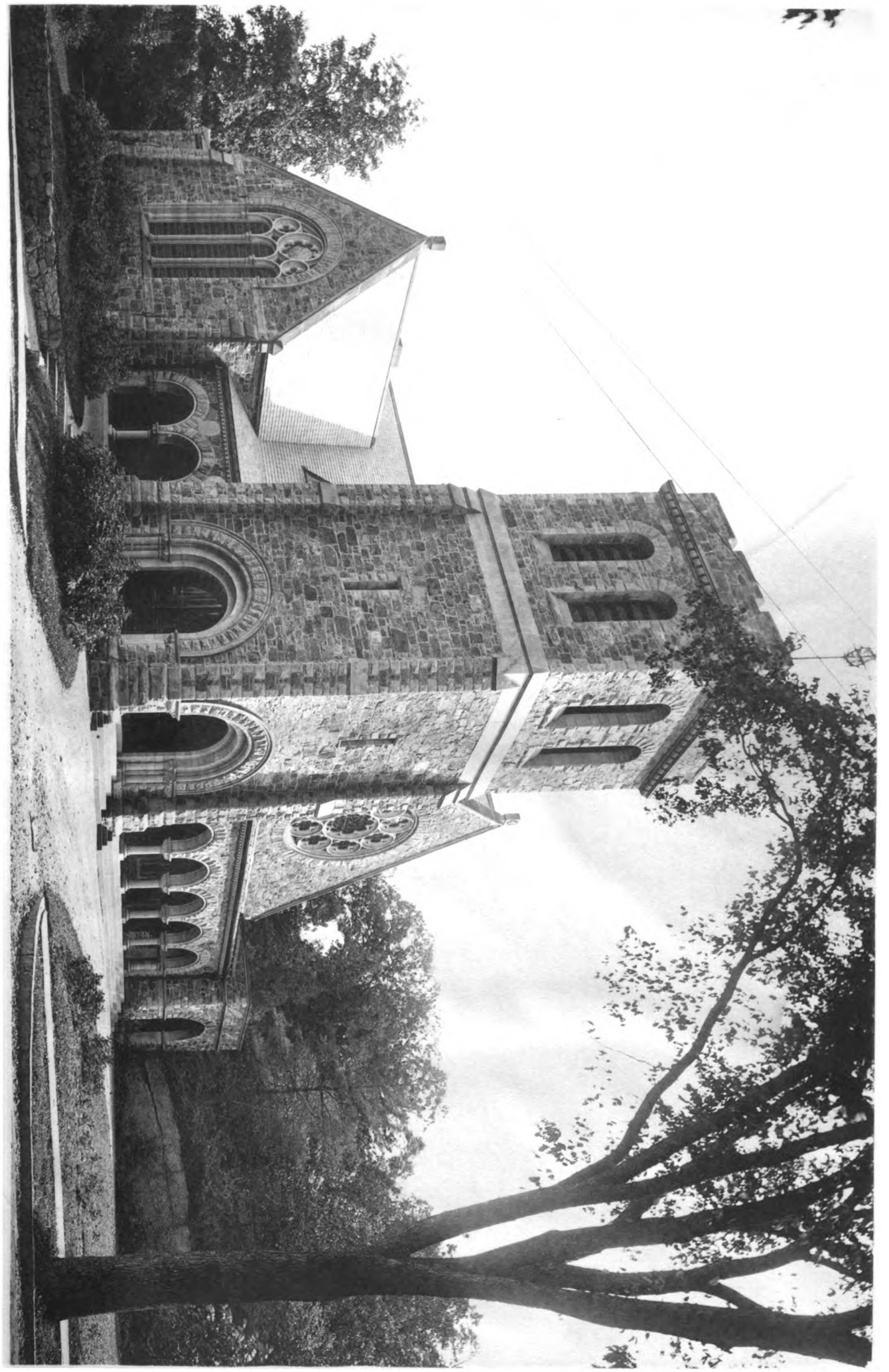


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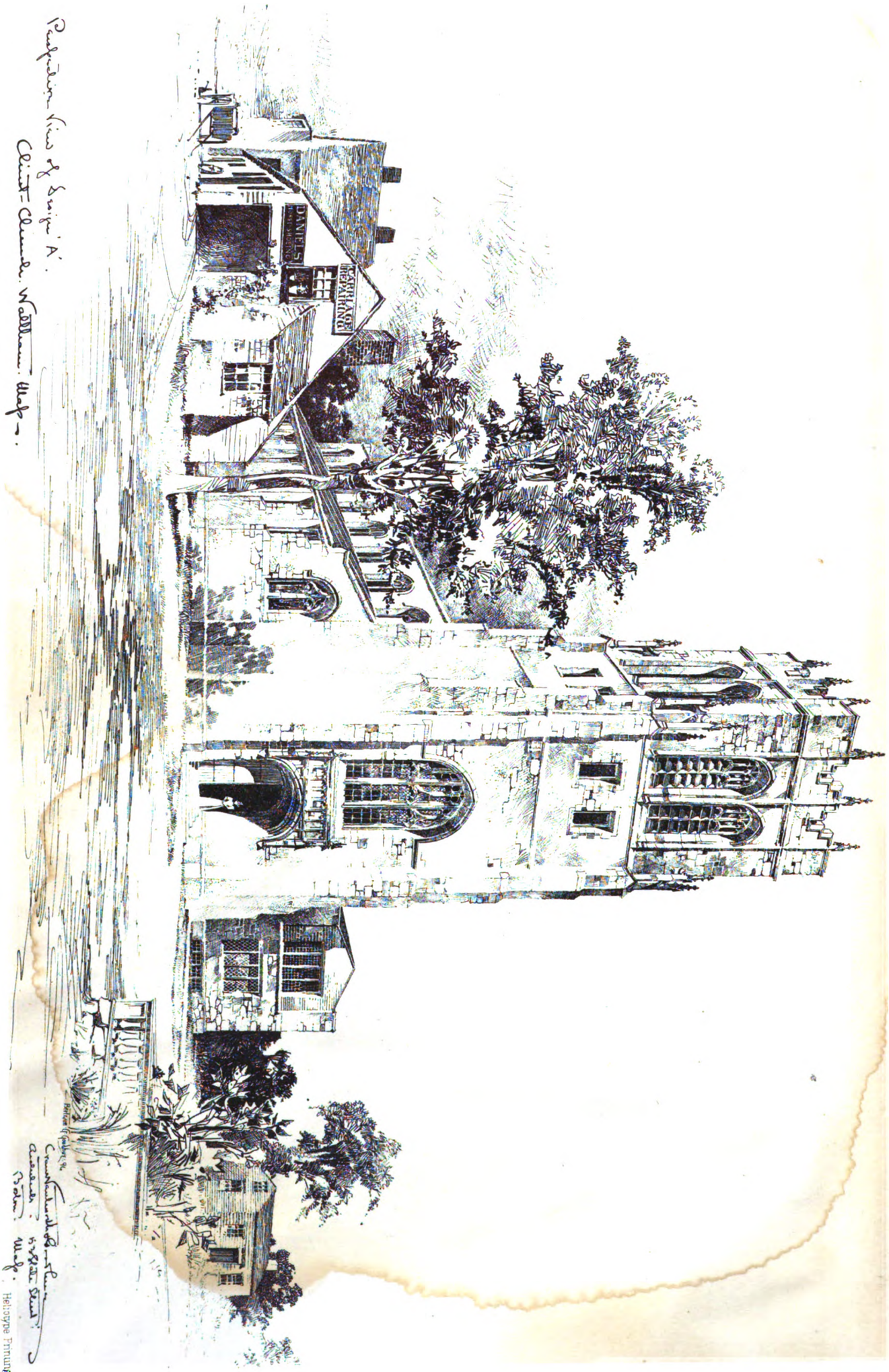
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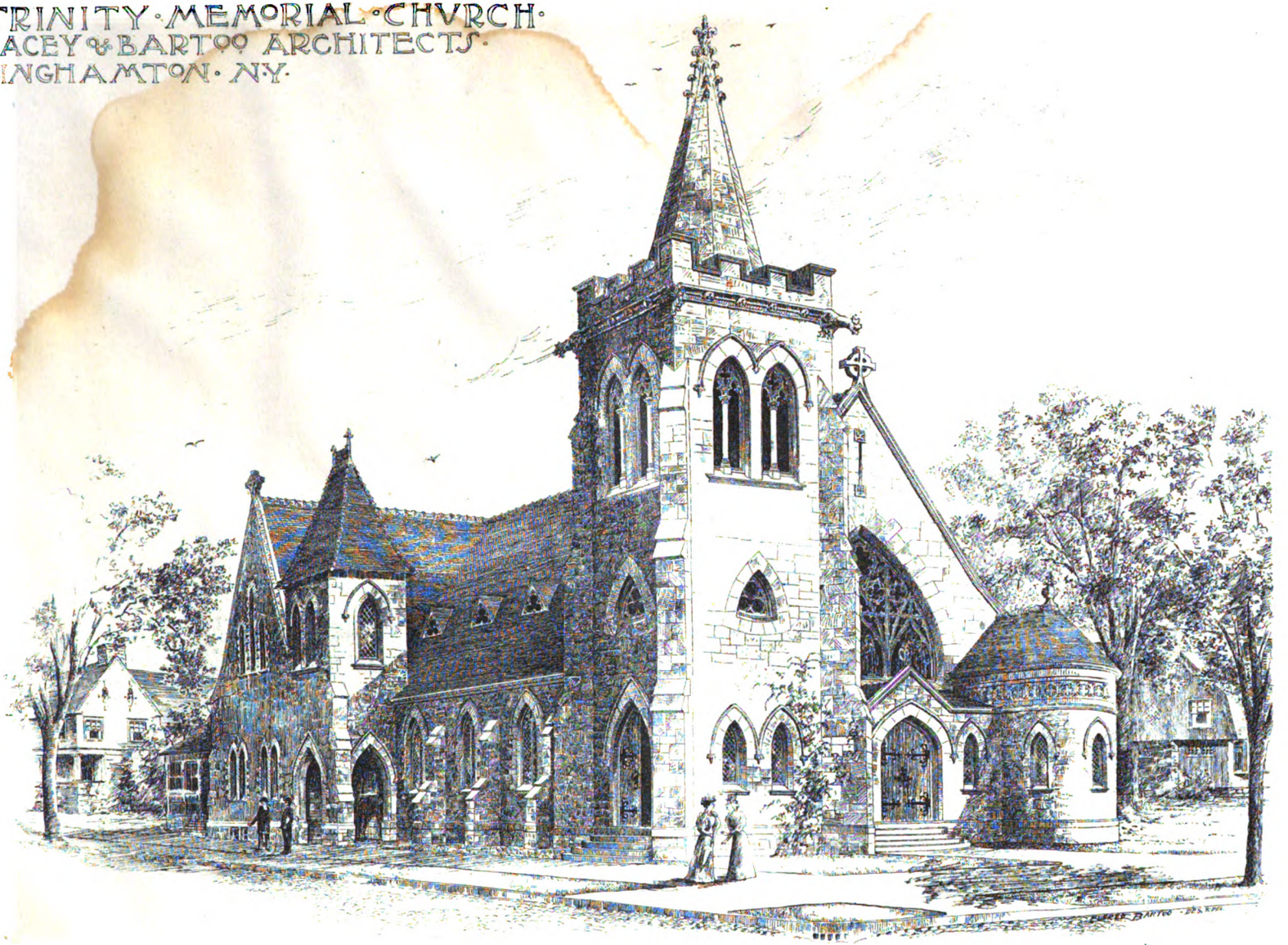
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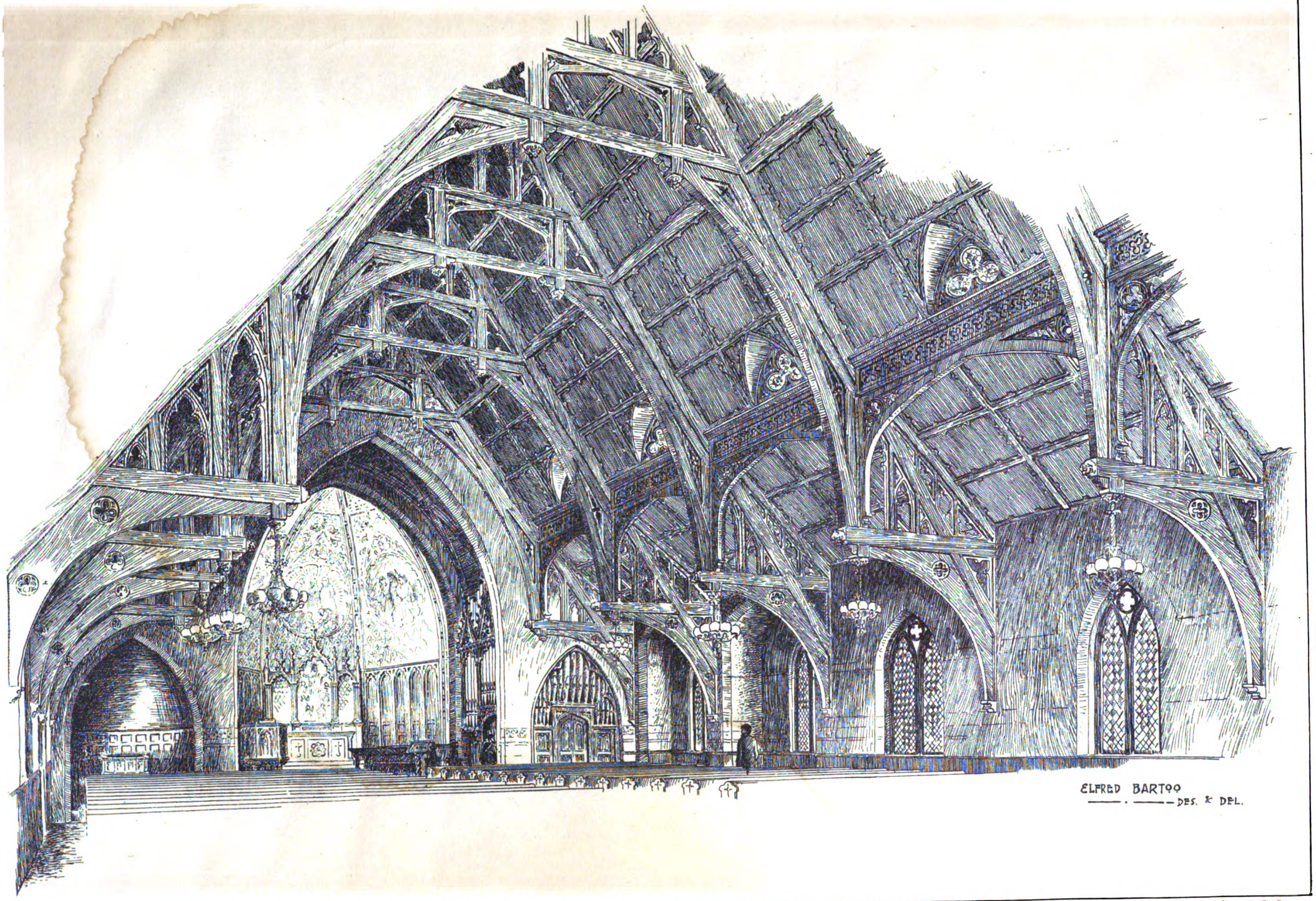
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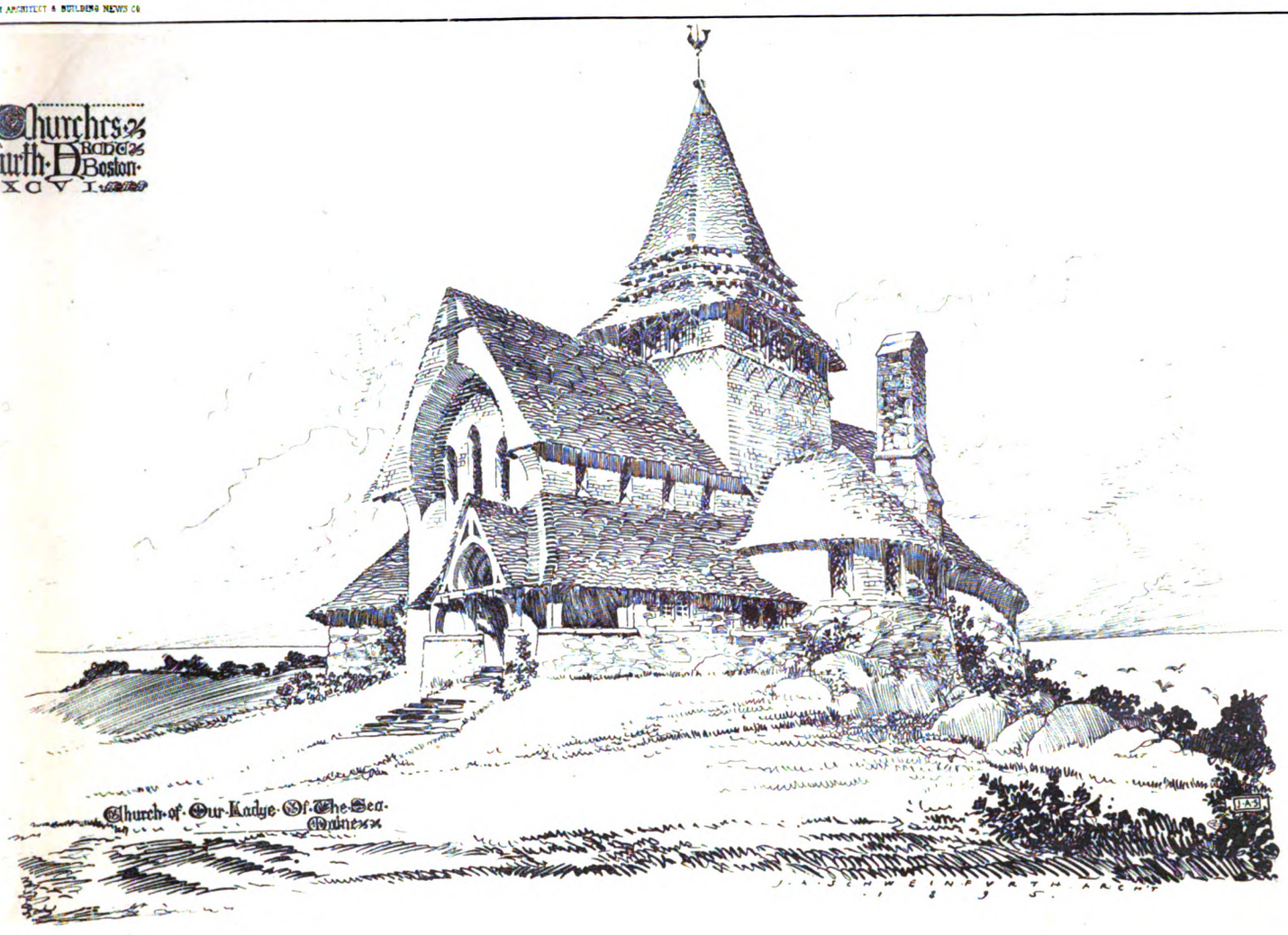


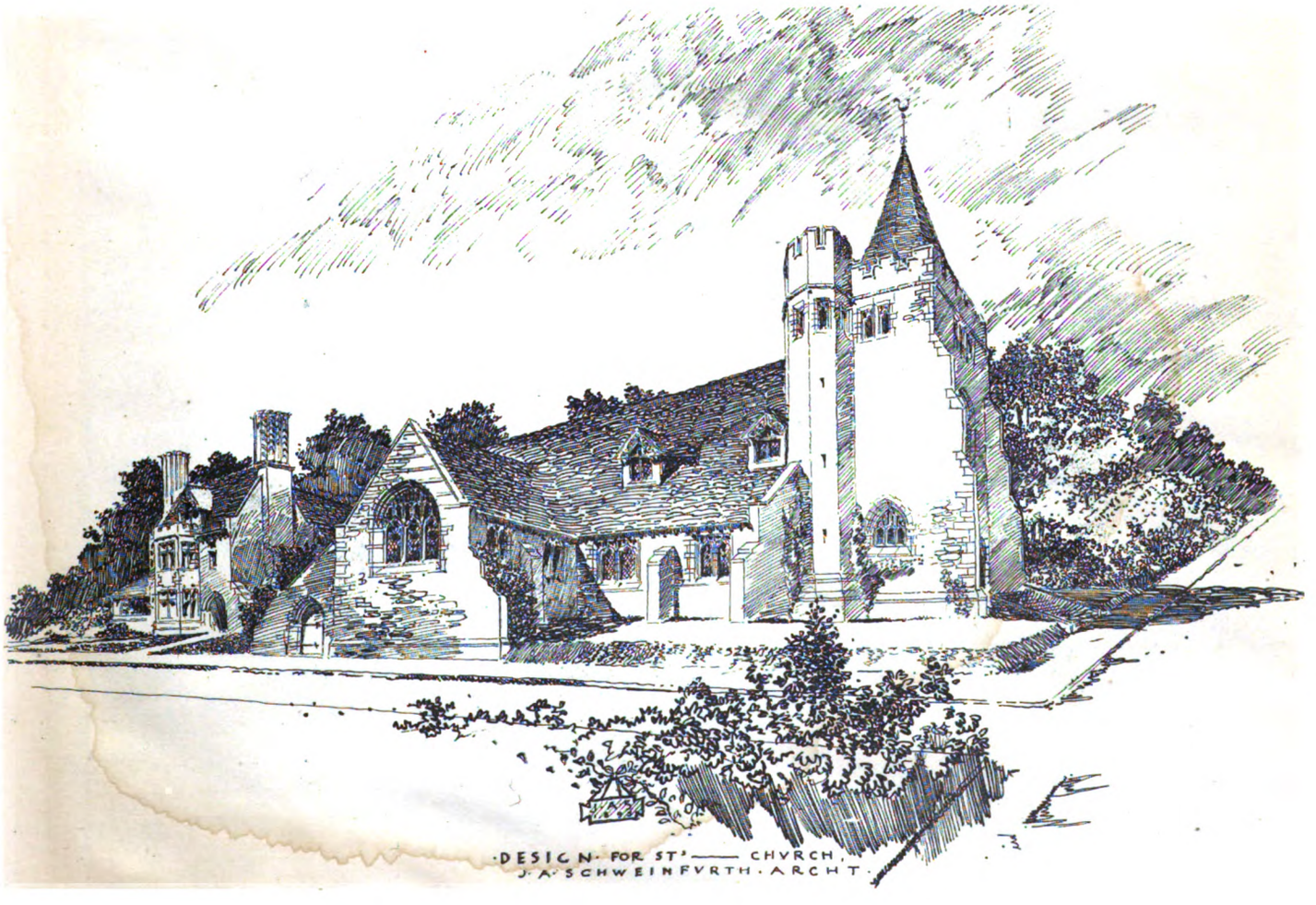


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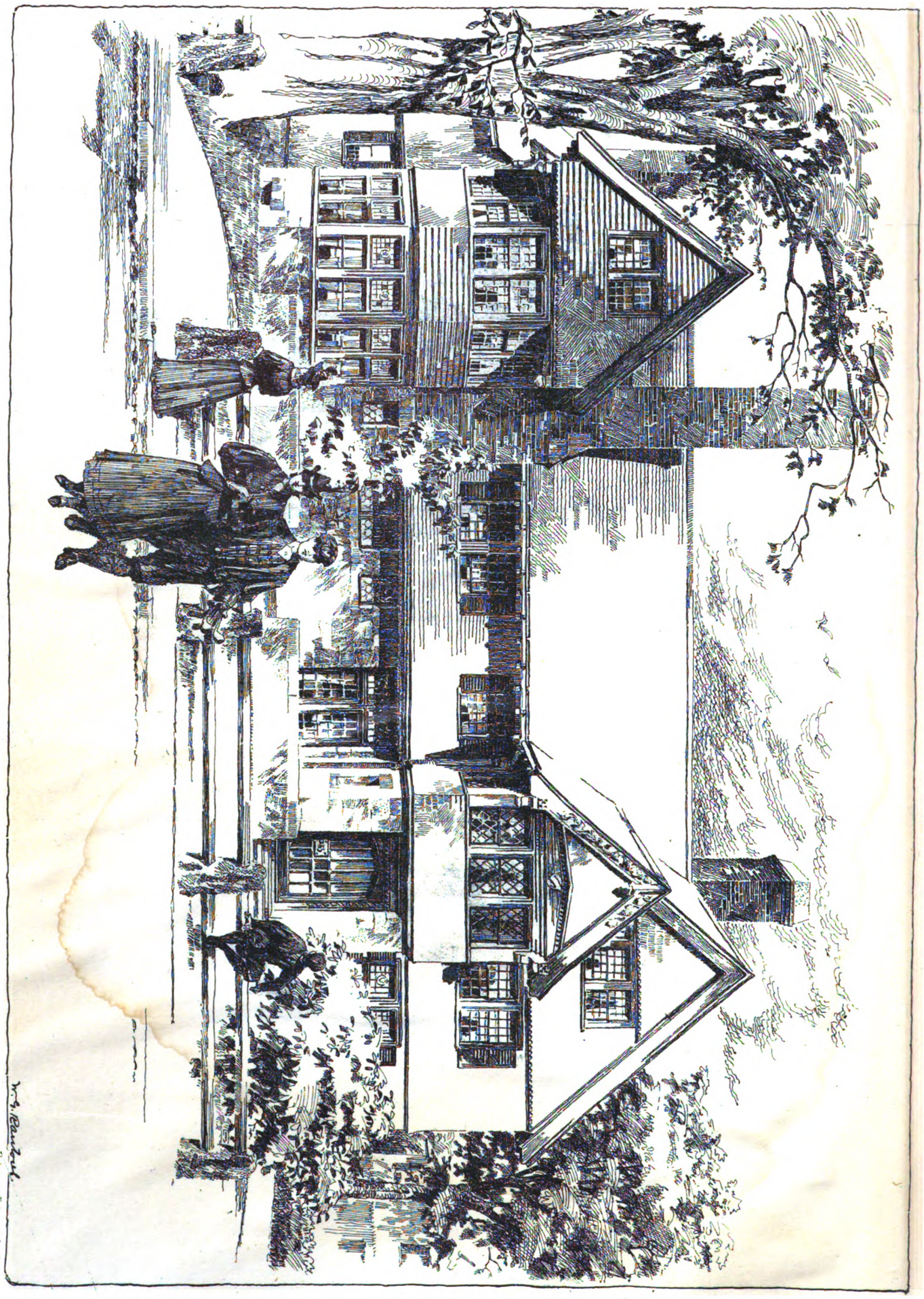
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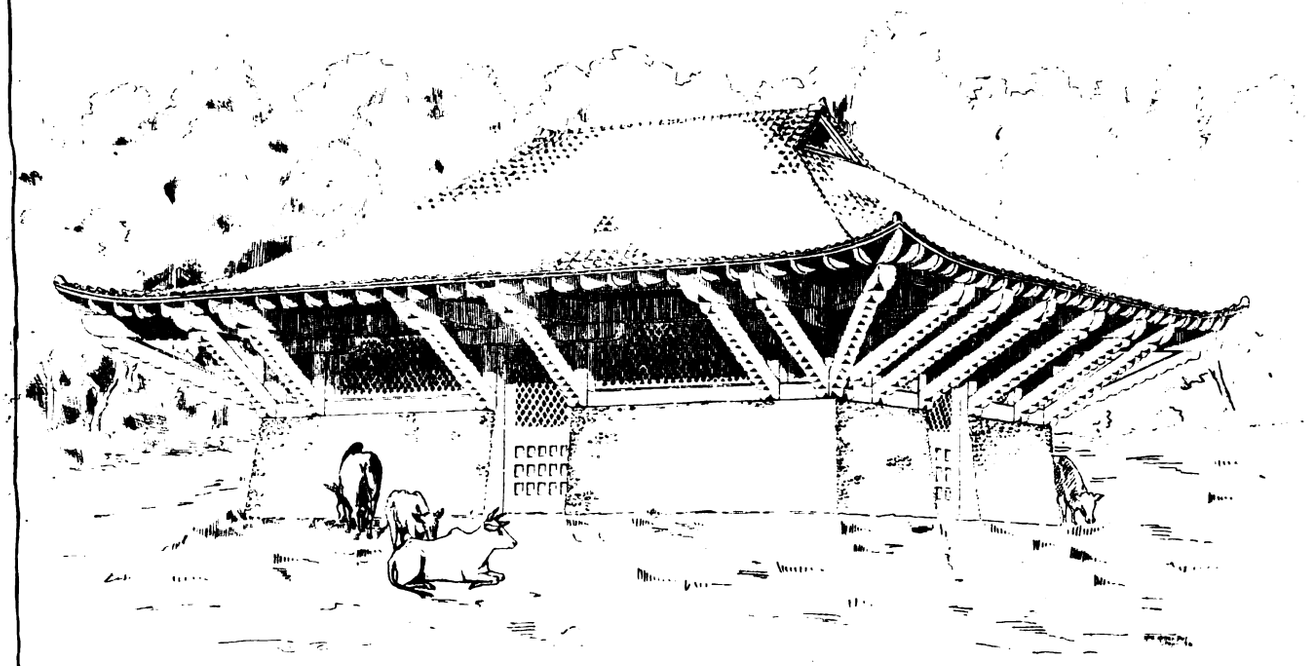
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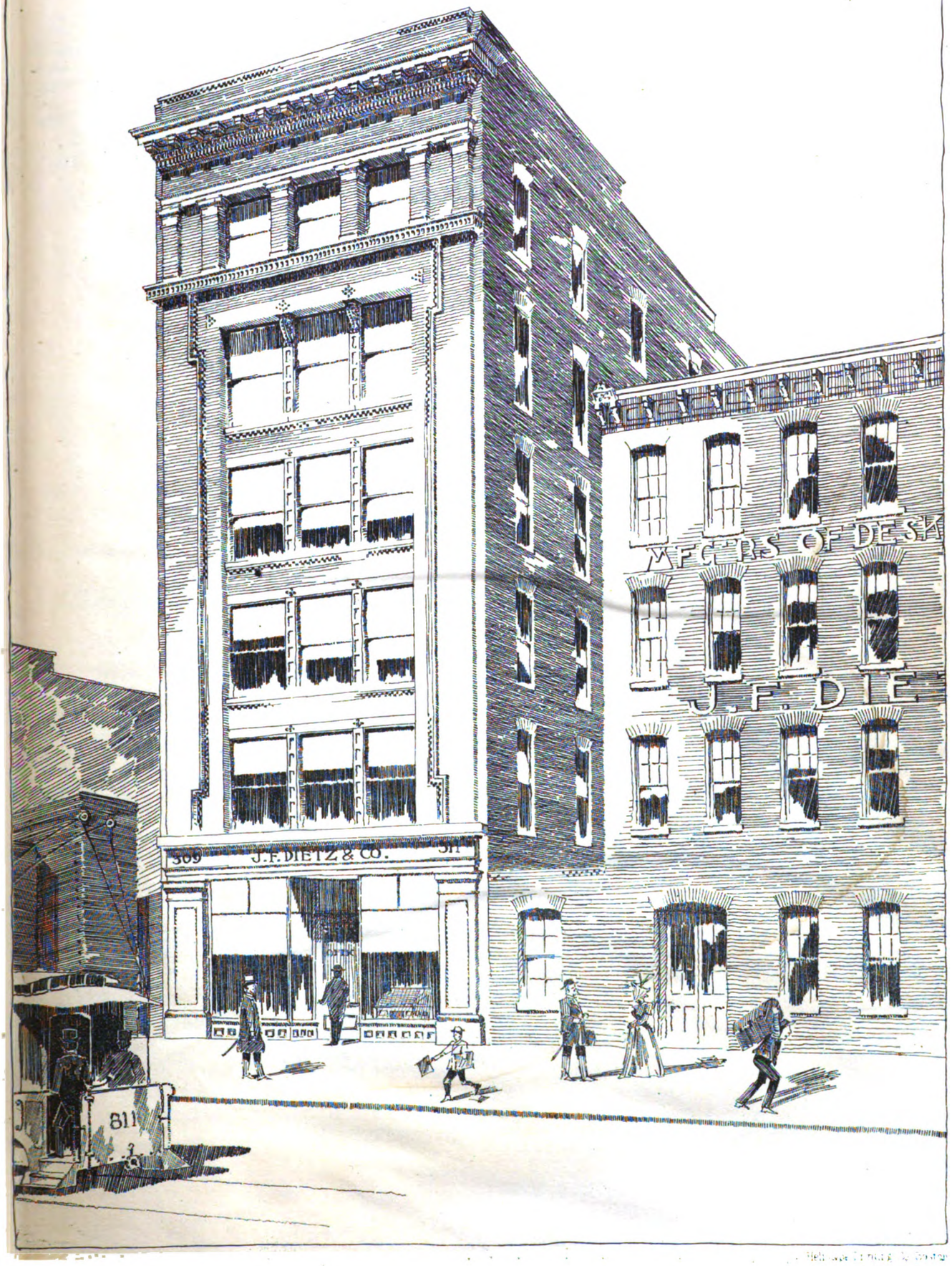
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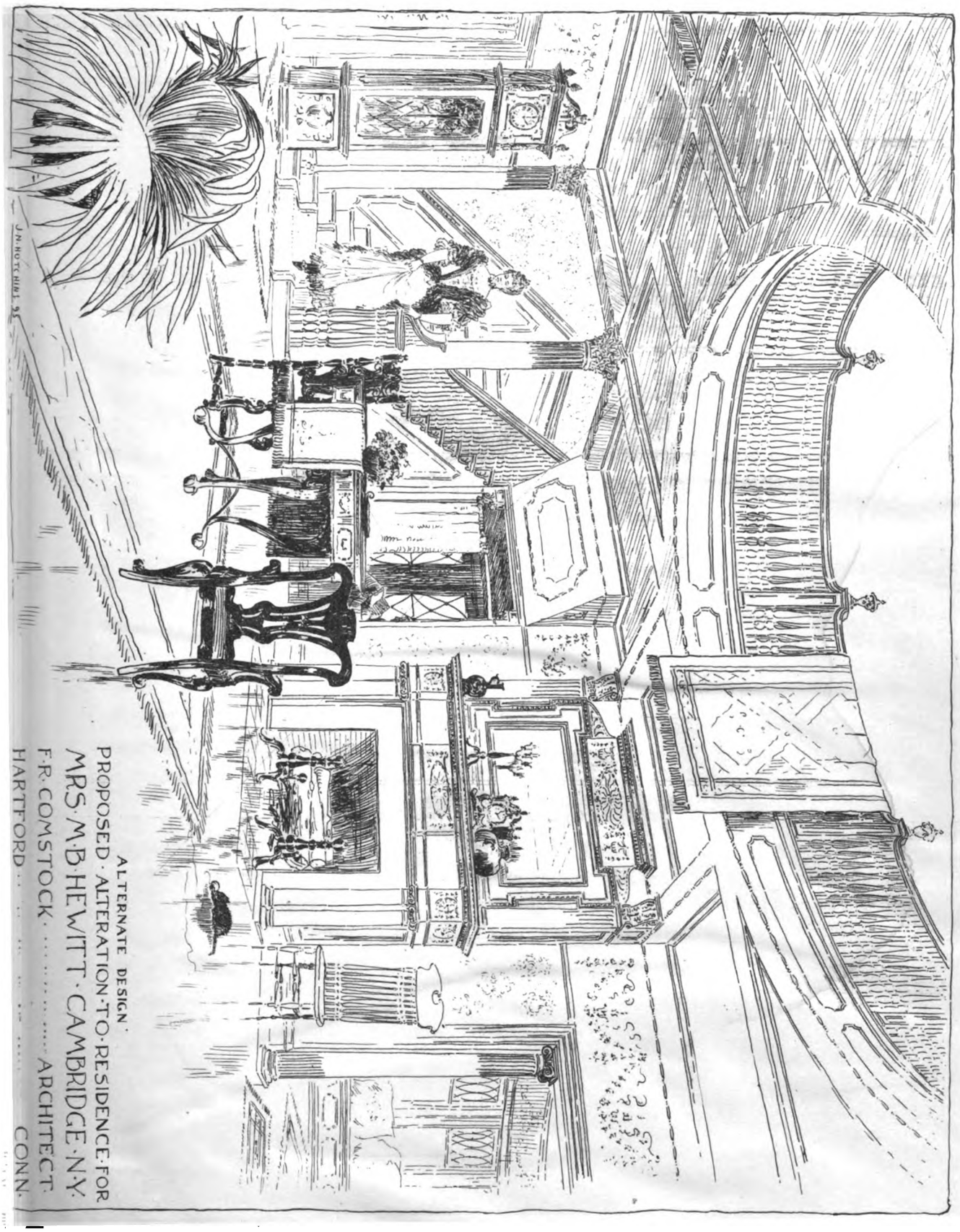
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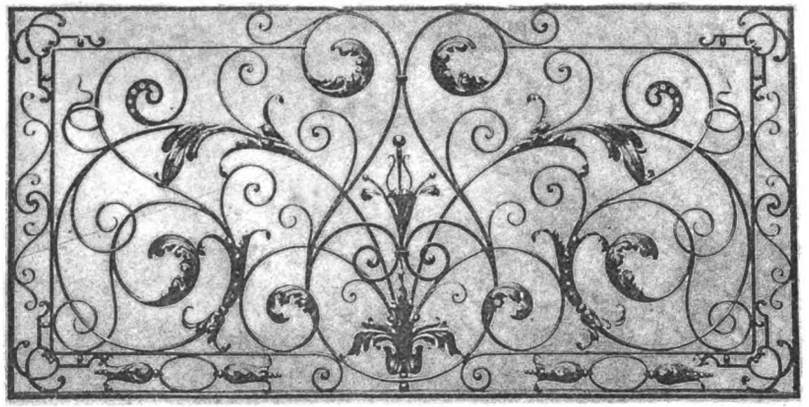
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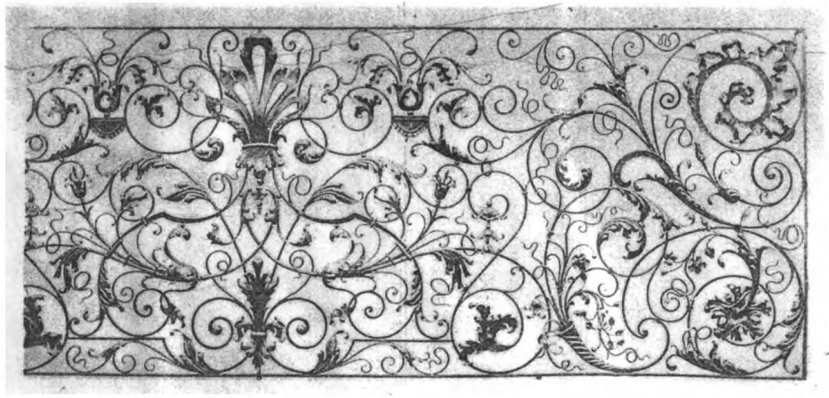
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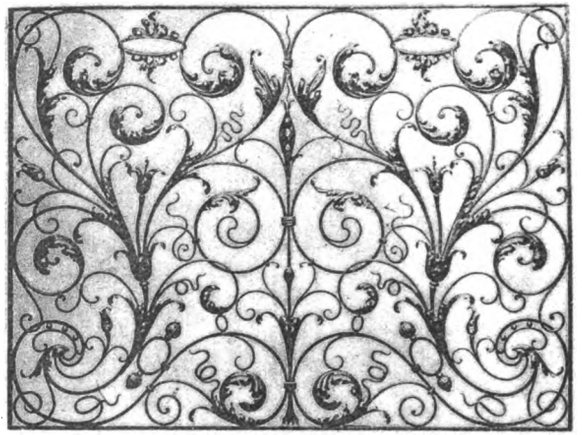








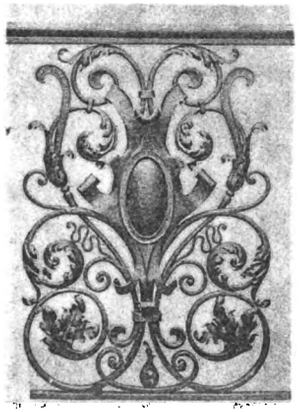
















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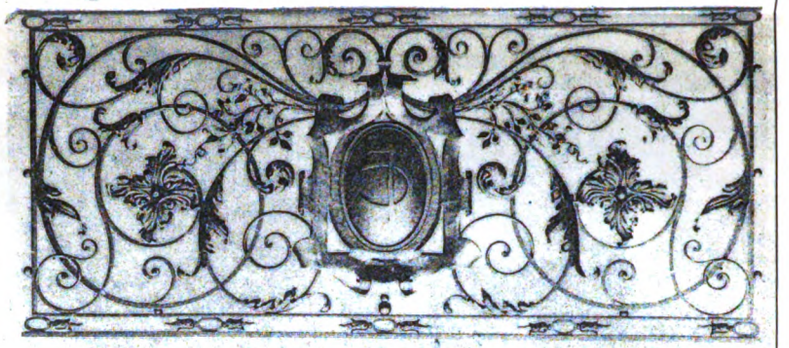
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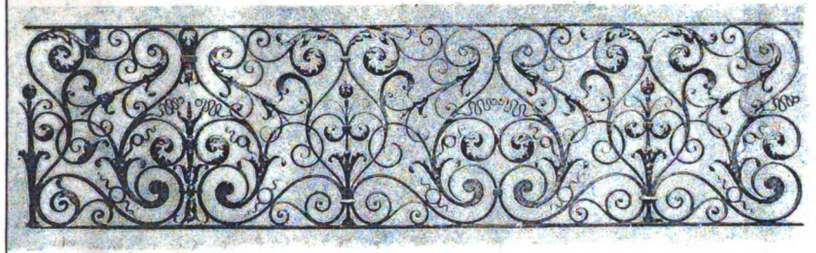
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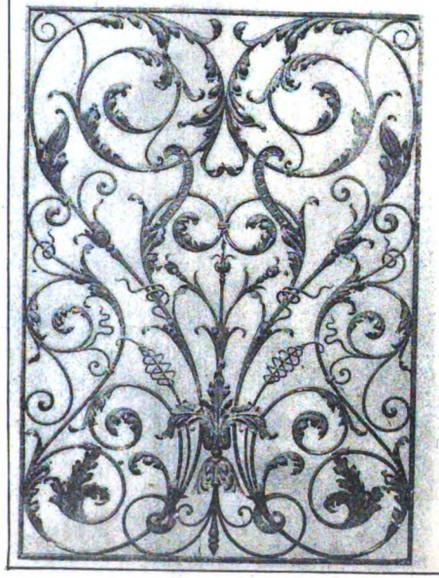


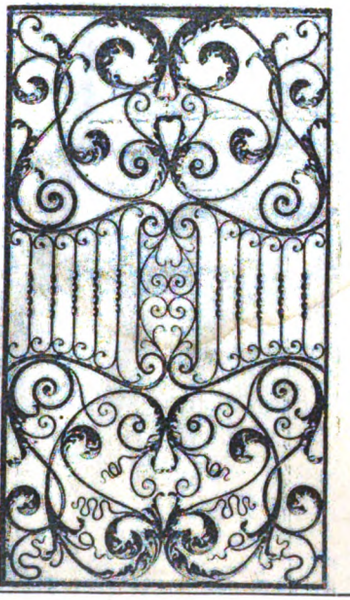




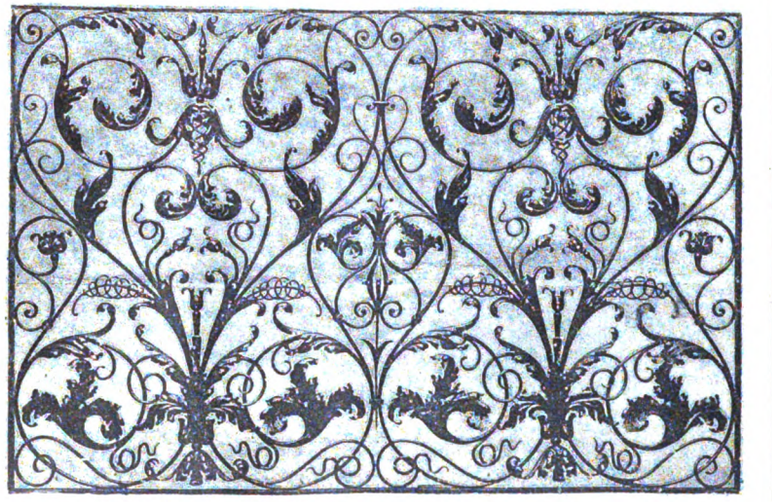








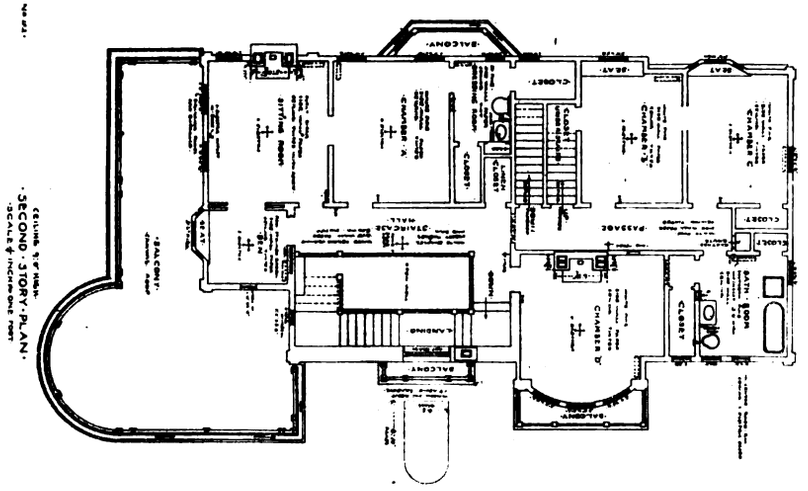


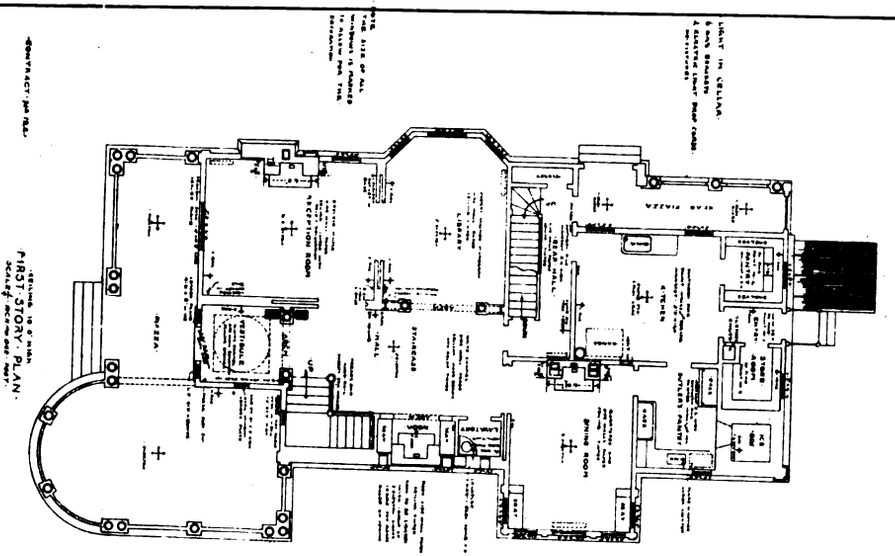


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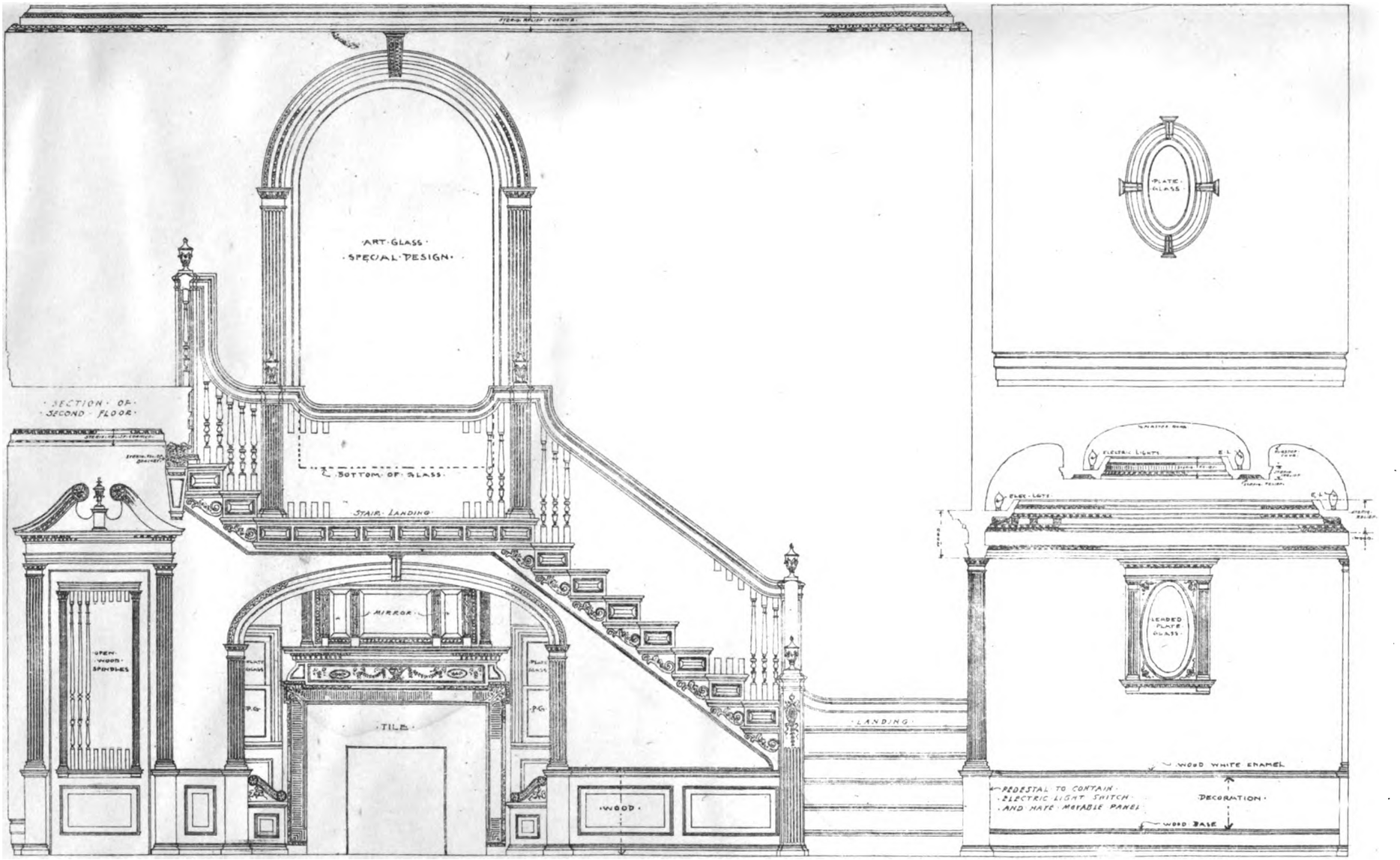






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HARTFORD CONN
ARCHITECT
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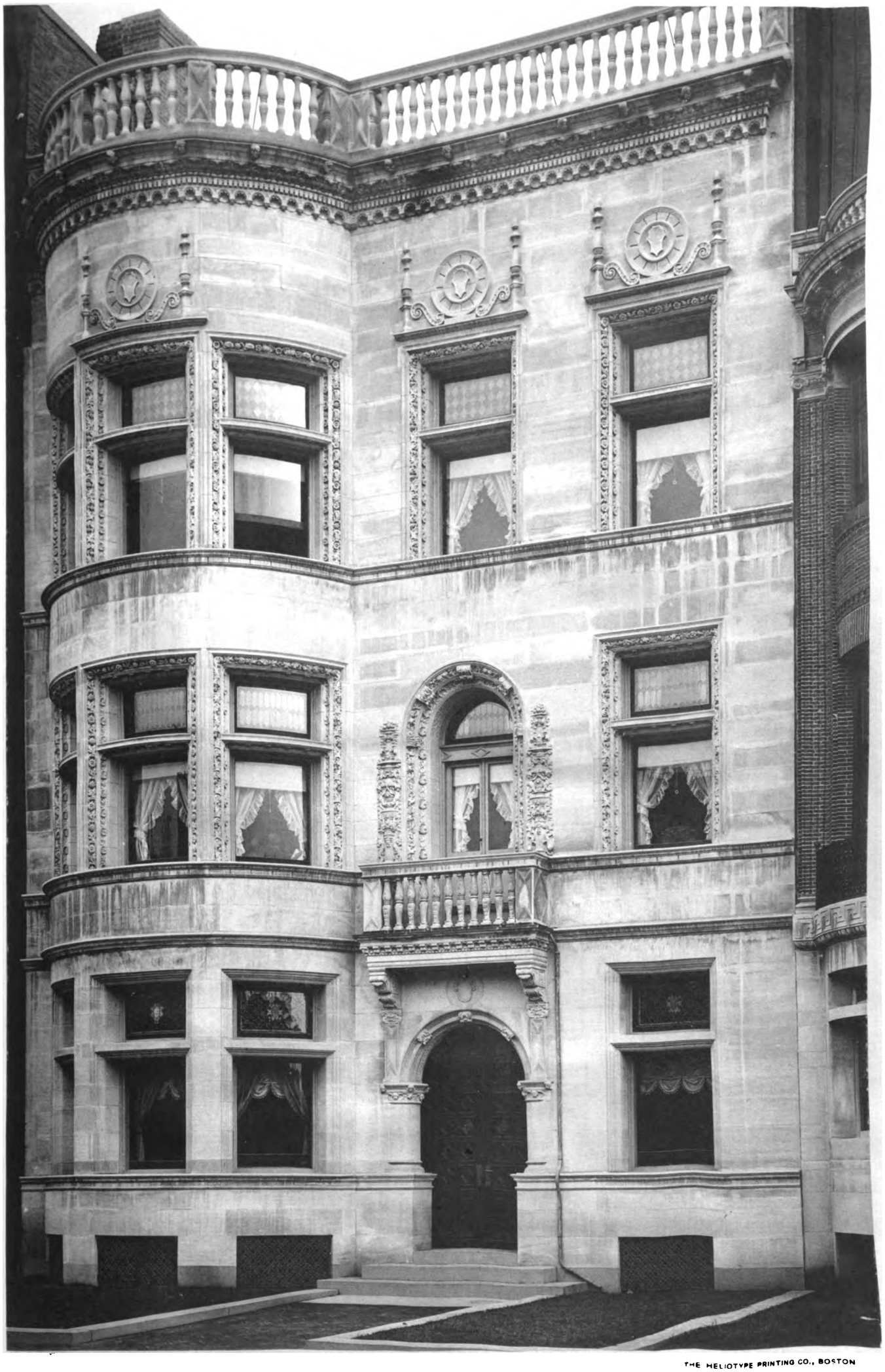


ELEVATION OF STAIRS

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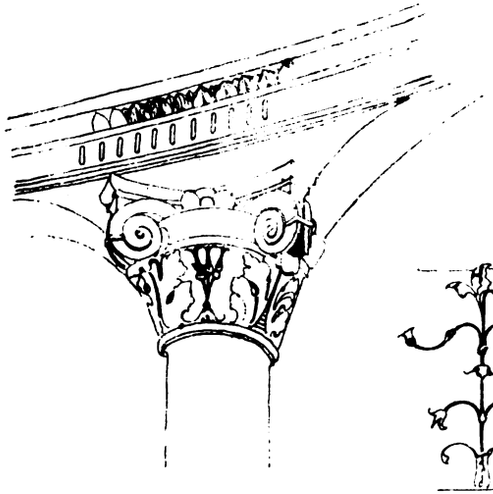
J. A. SCHWEINFURTH, Architect.

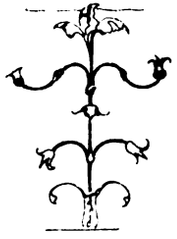
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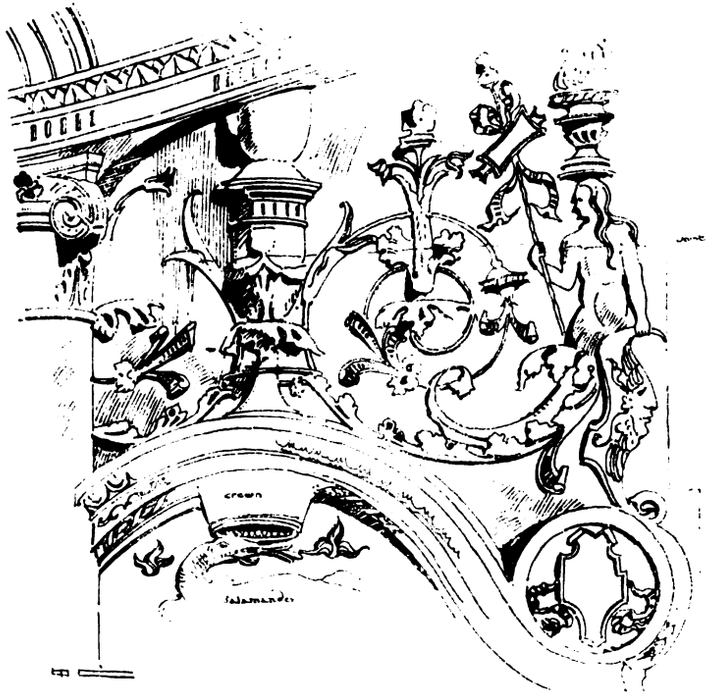
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CHATEAU DE BLOIS

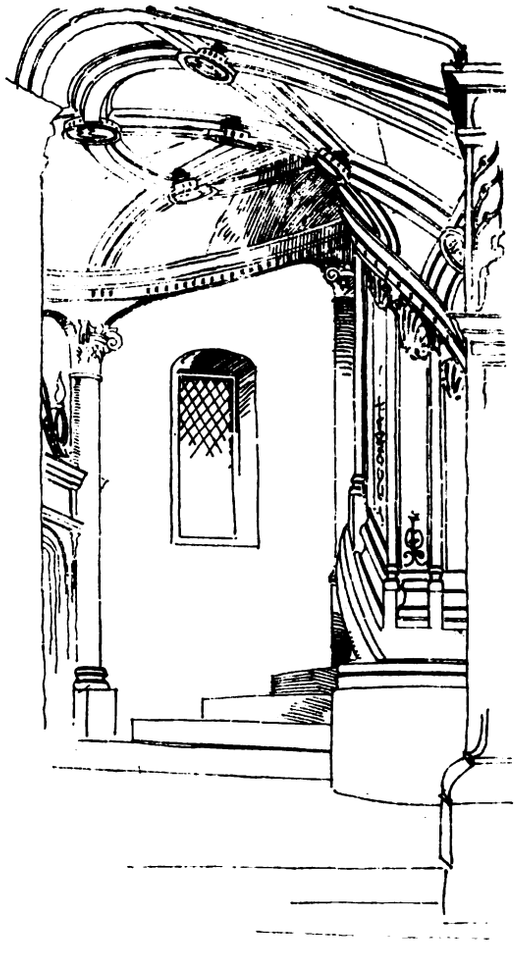




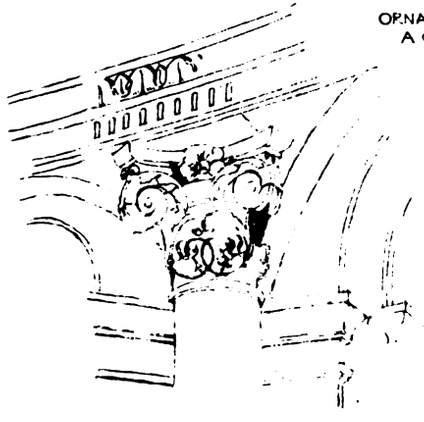
ORNAMENT FROM A CAPITAL



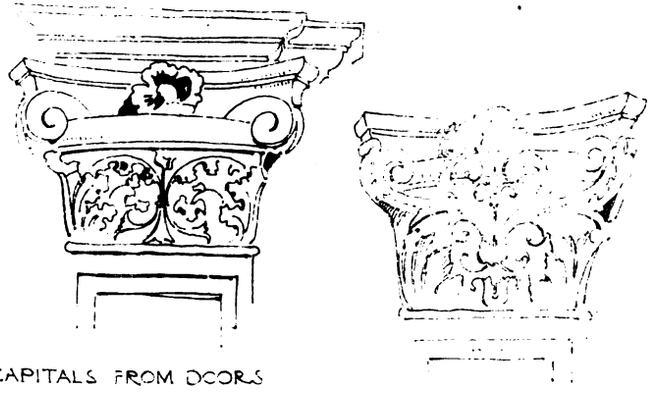
PEDIMENT OVER DOOR



ENTRANCE TO STAIRCASE



CAPITALS UNDER VAULT



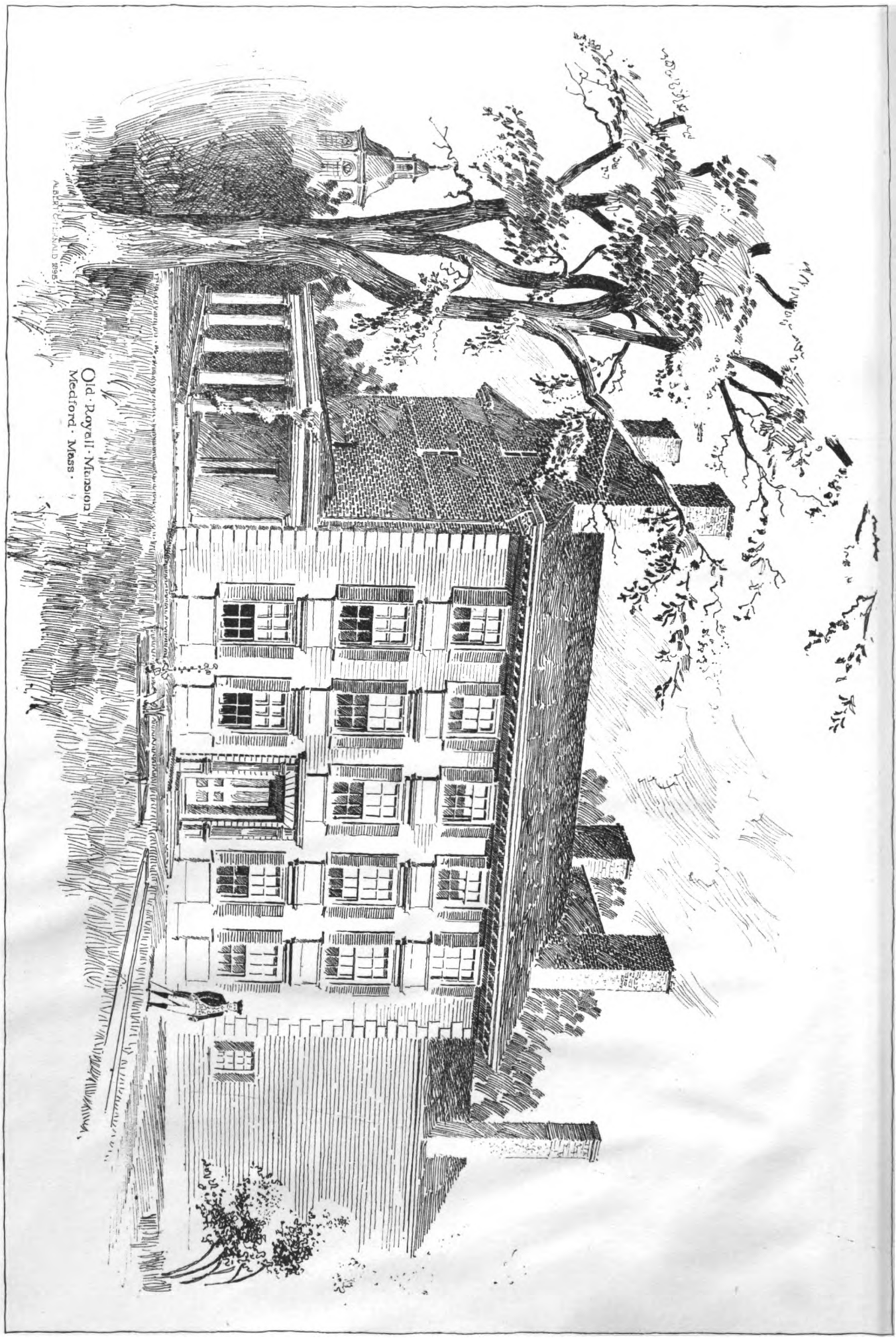
CAPITALS FROM DOORS

STAIRCASE - FACADE FRANCIS I - DETAILS

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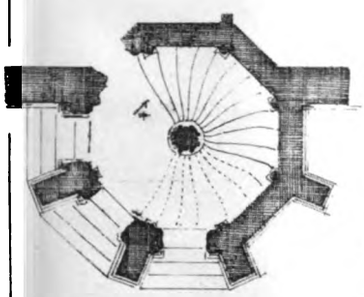


Old Royall Mansion
Medford Mass.

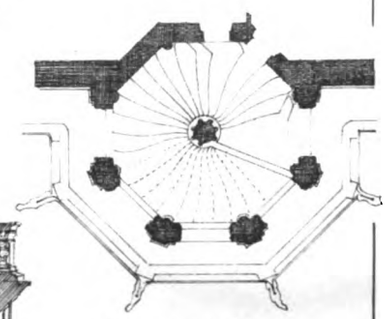
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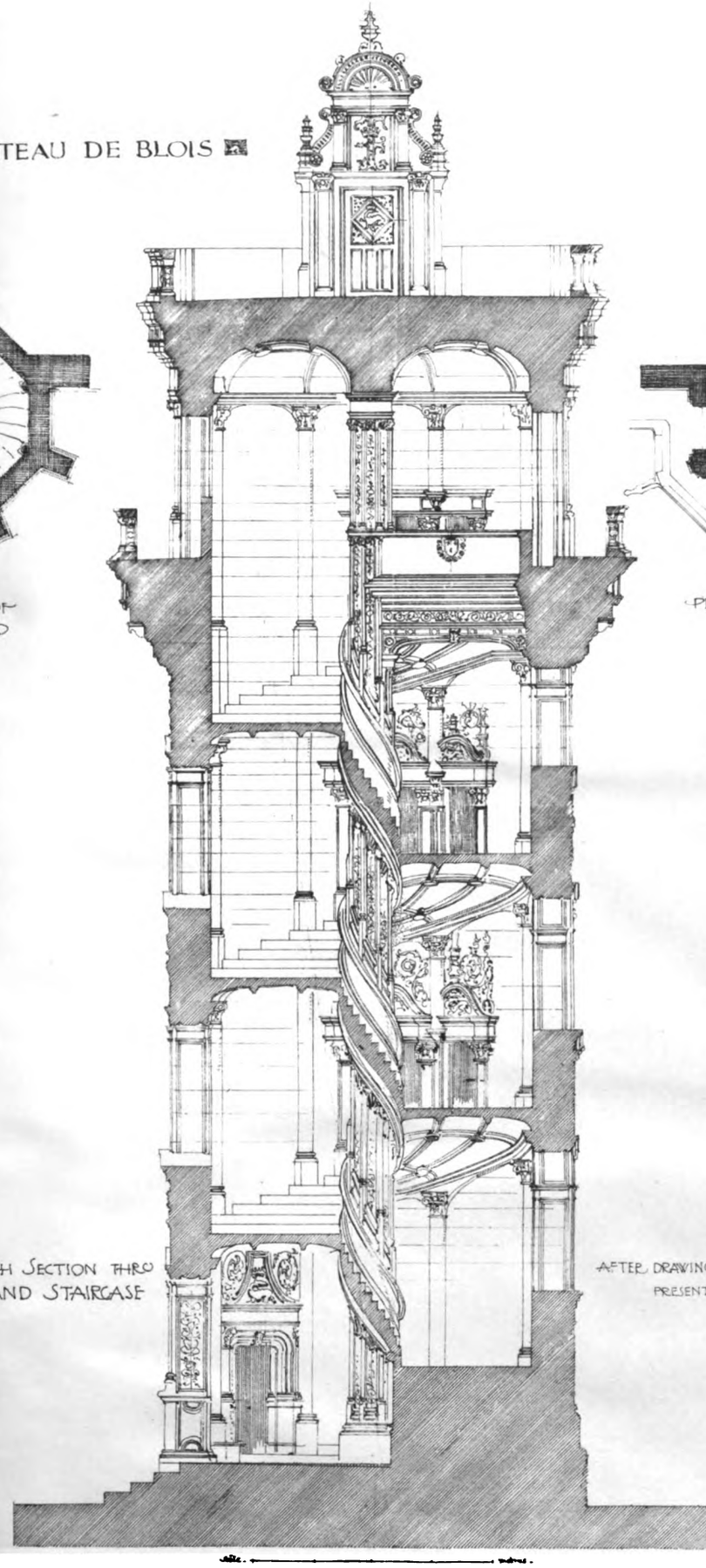
CHATEAU DE BLOIS



PLAN AT LEVEL OF COURTYARD



PLAN AT LEVEL OF CORNICE



SKETCH SECTION THRO GRAND STAIRCASE

AFTER DRAWINGS FOR THE PRESENT RESTORATION.

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DOOR ON LANDING

PLAN

SECTION

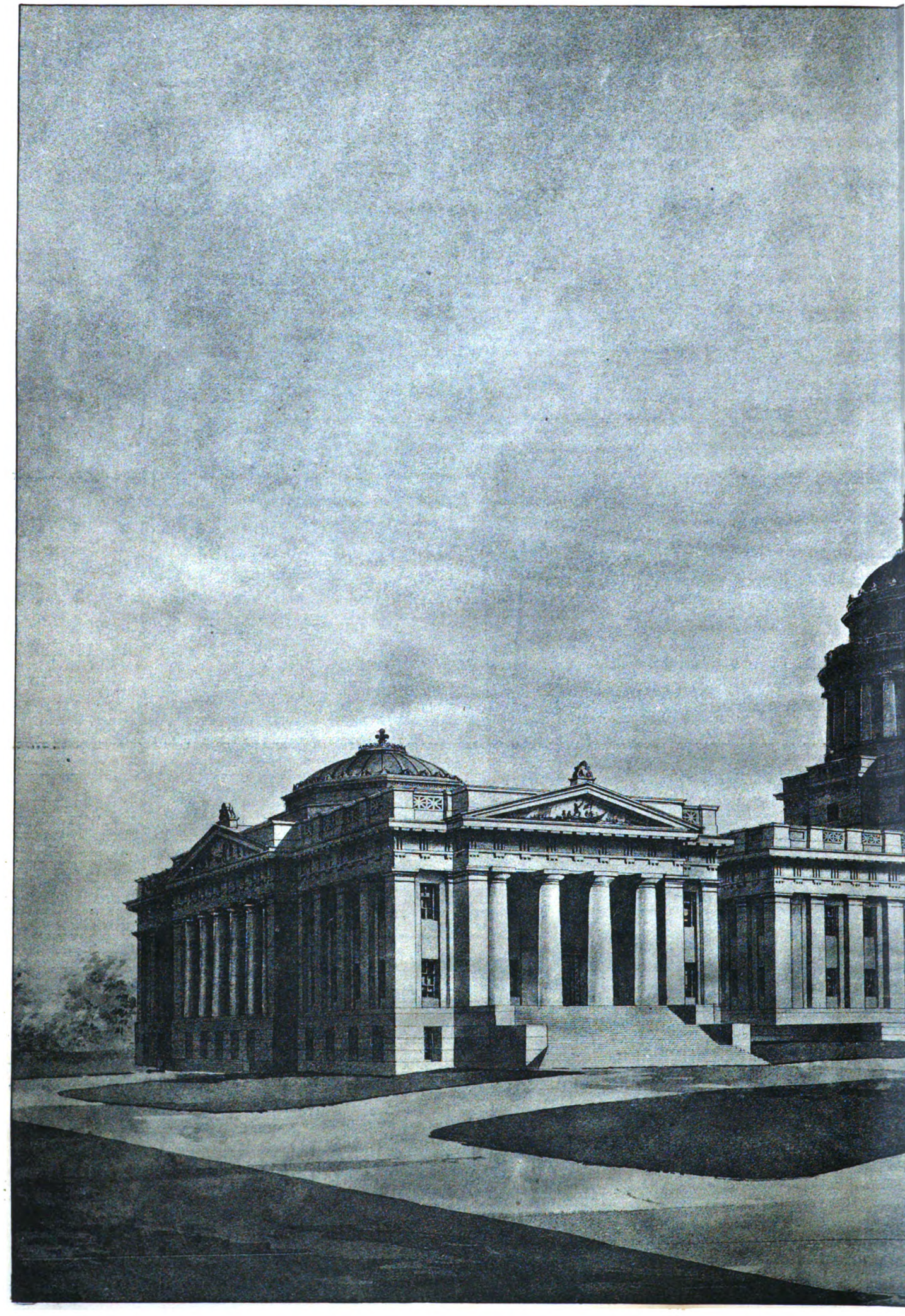
DOOR ON LANDING

DETAILS OF STAIRCASE - FACADE of FRANCIS I

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PROPOSED ENLARGEMENT AND ALTERATION

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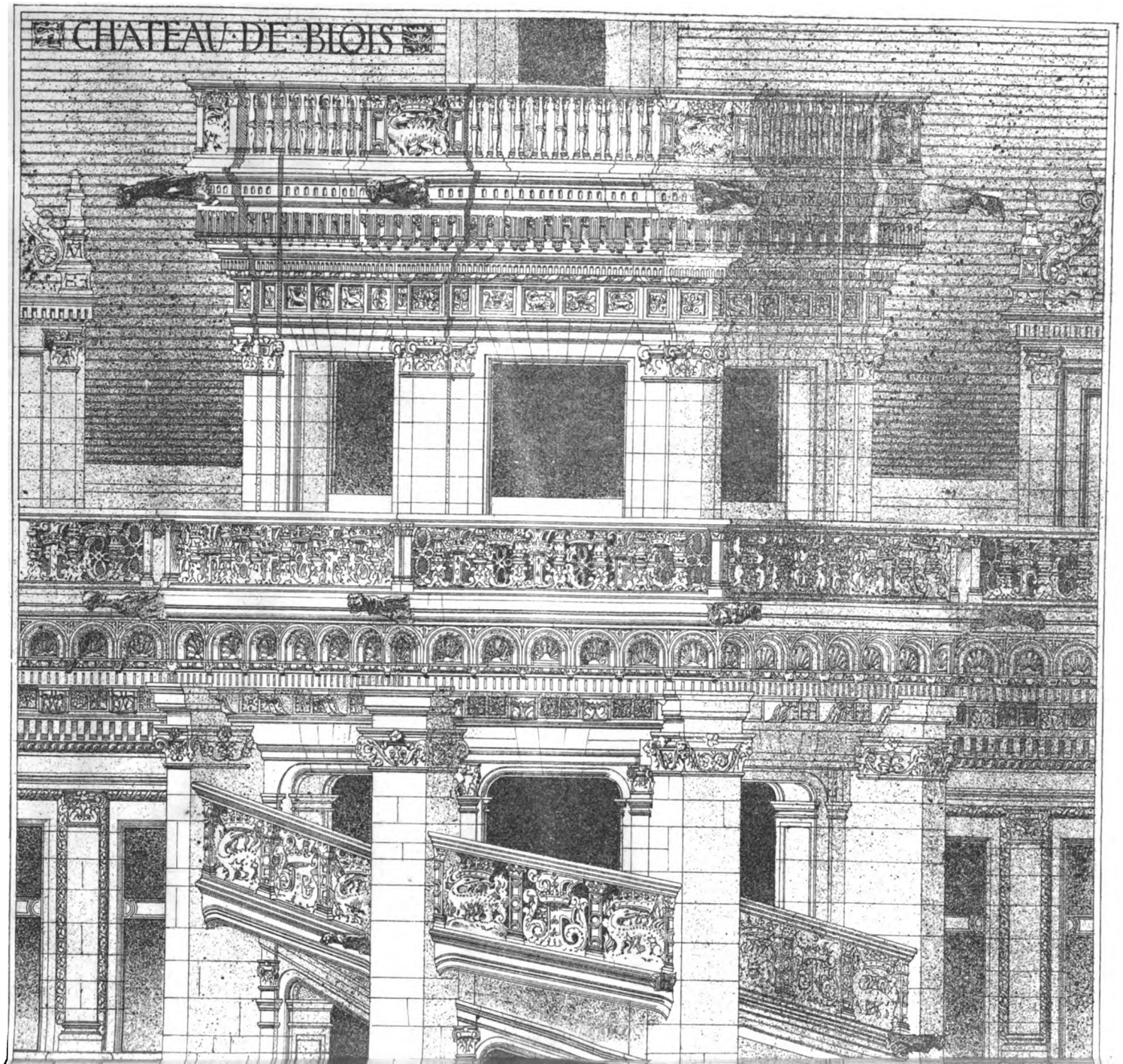
ON OF THE OHIO STATE-HOUSE, COLUMBUS, O.

CKARD, ARCHITECTS.

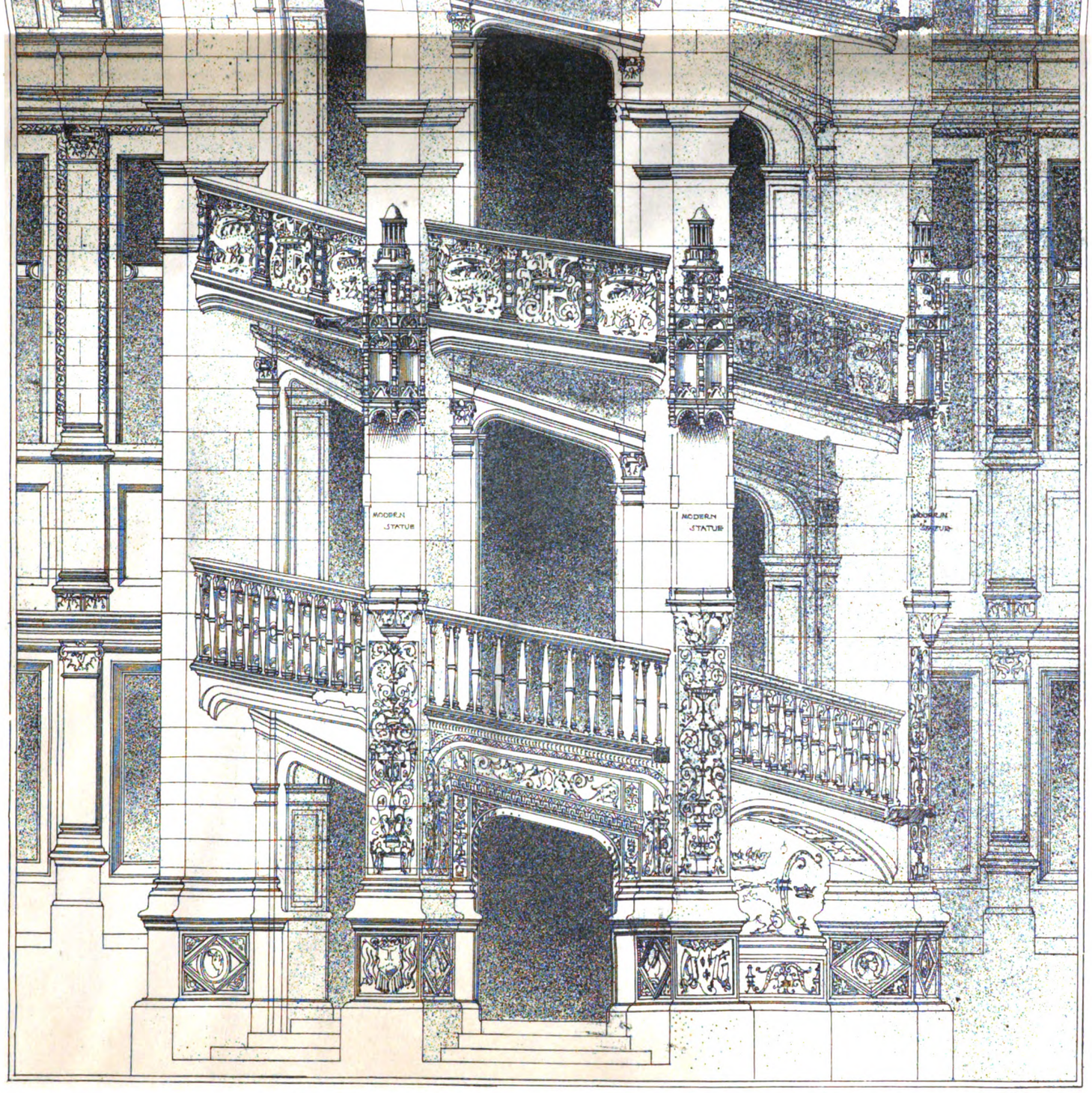
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THE GRAND STAIRCASE . CHATEAU DE BLOIS.

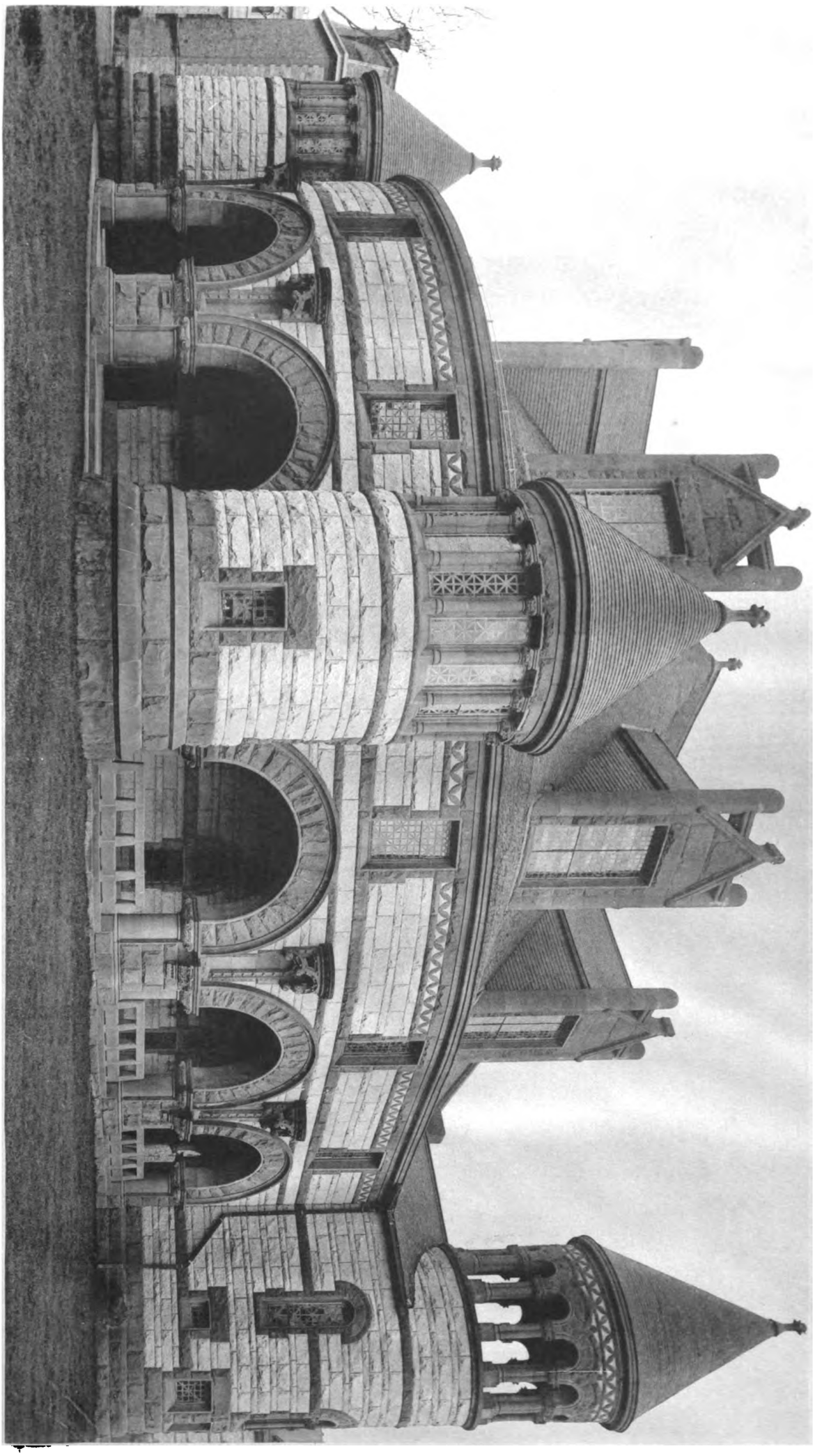
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REAR VIEW OF ALEXANDER HALL, PRINCETON UNIVERSITY, PRINCETON, N. J

W. A. POTTER, Architect.

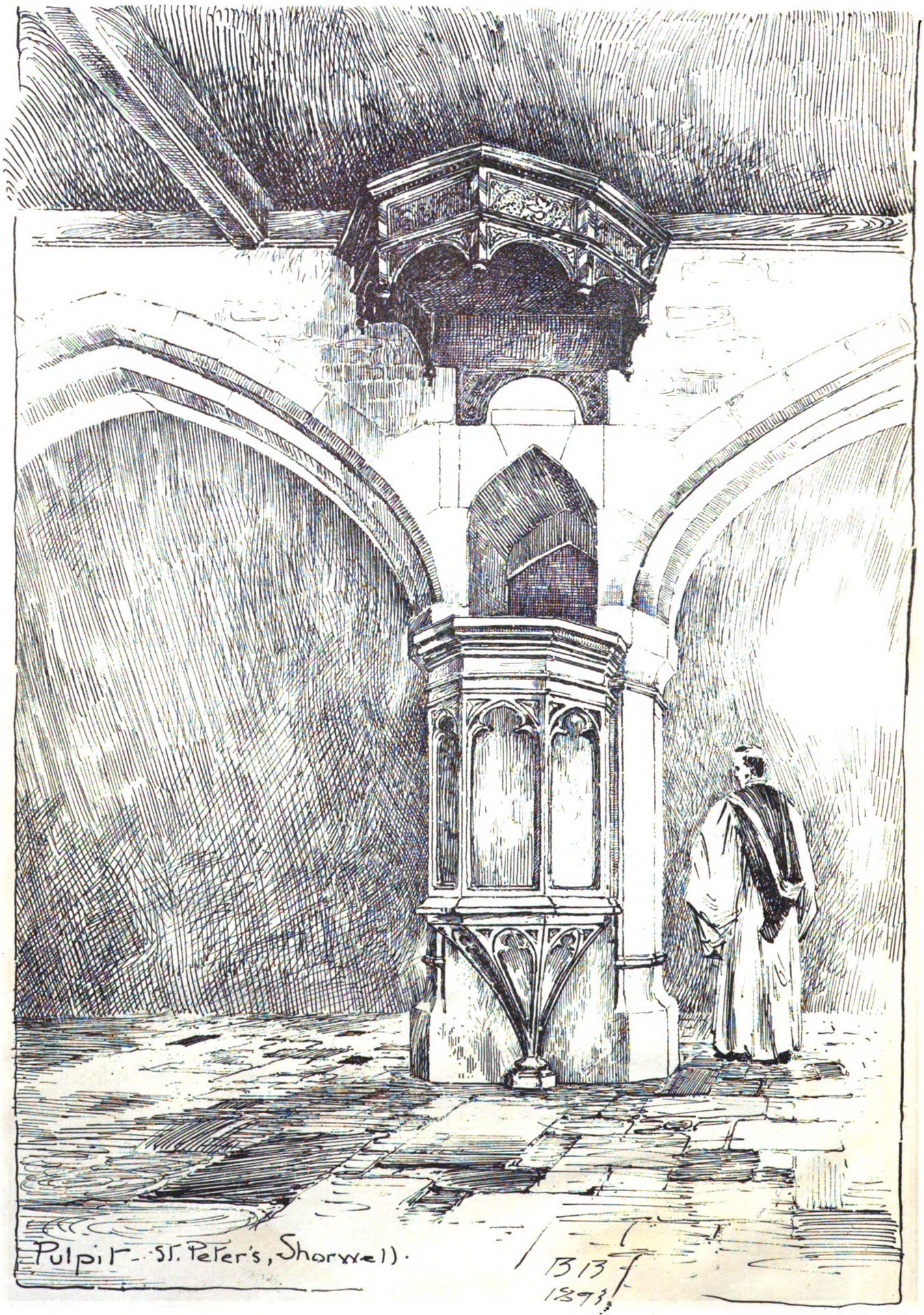
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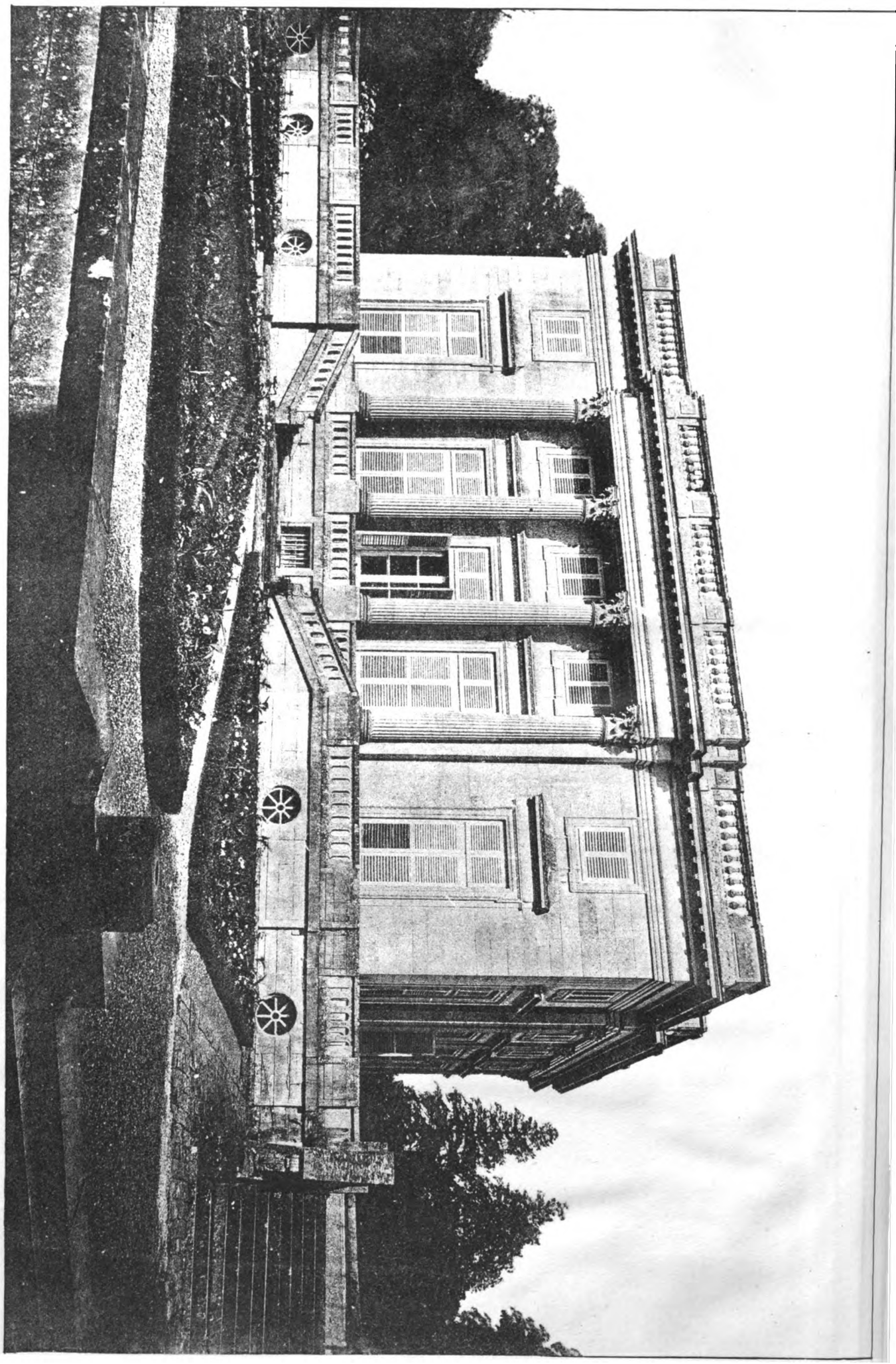
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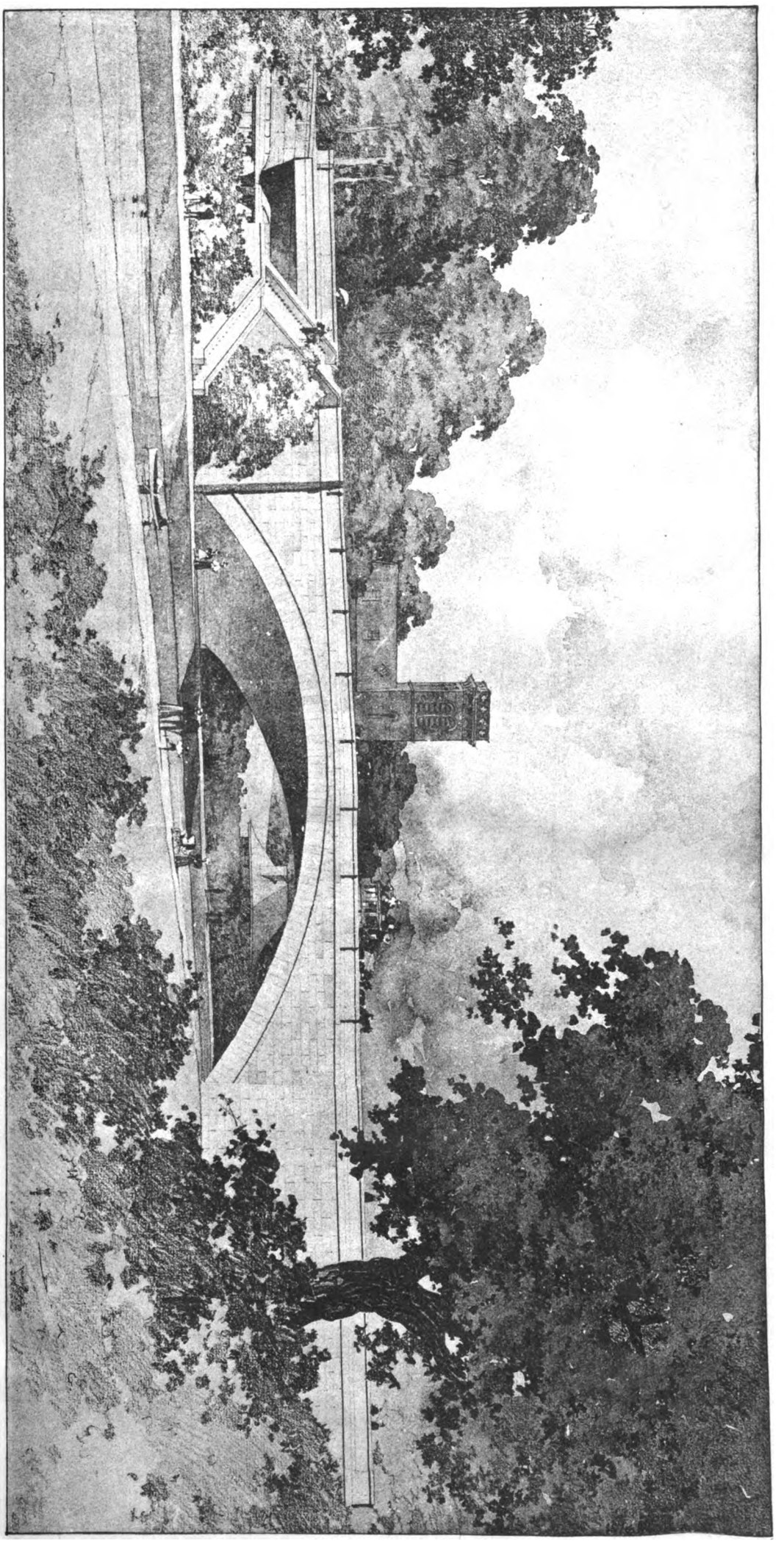
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J. A. GABRIEL, Architect.

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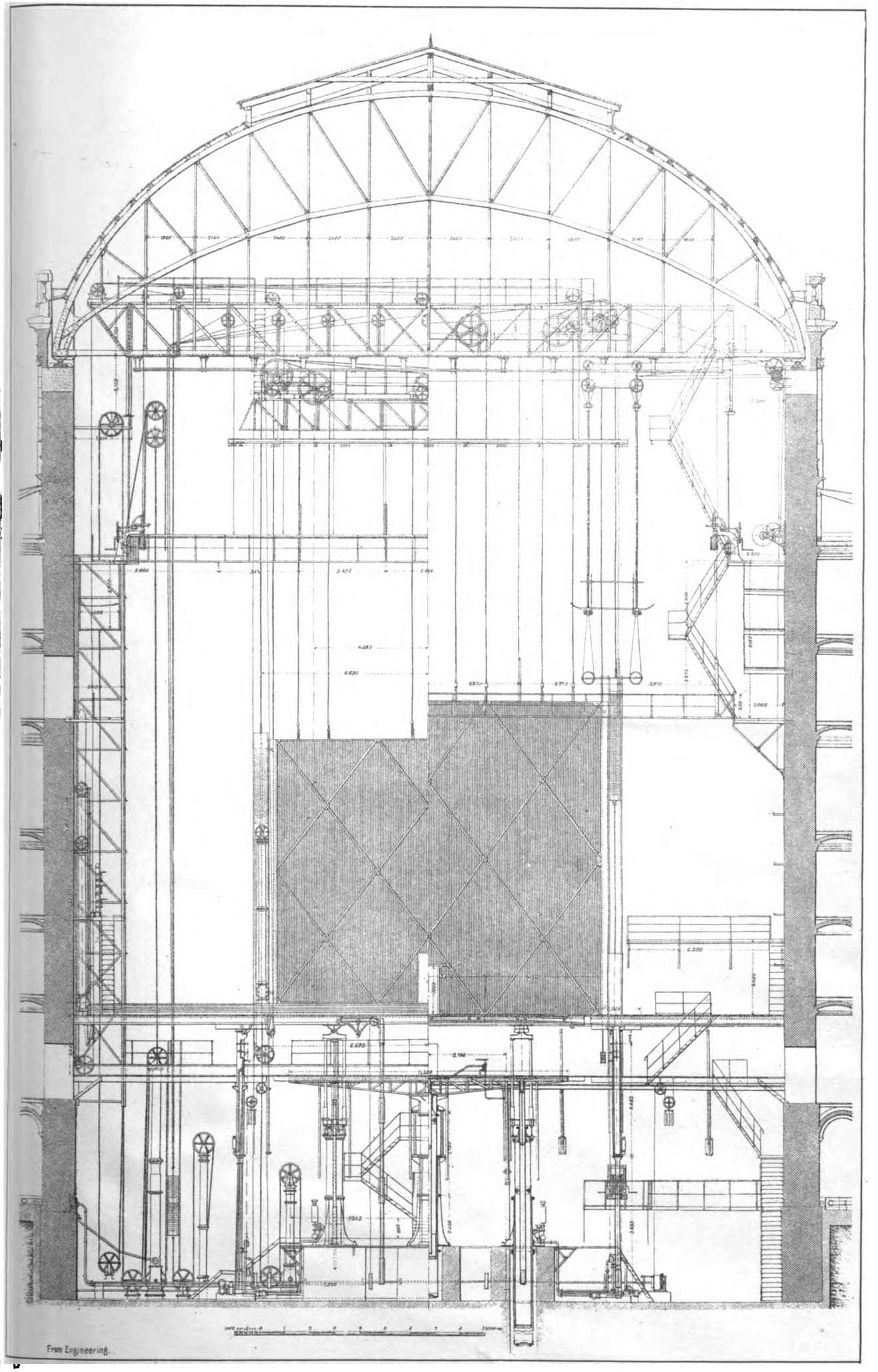


LONGWOOD AVENUE BRIDGE, BETWEEN BROOKLINE AND BOSTON.

SHEPLEY, RUTAN & COOLIDGE, Architects.

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From Engineering.

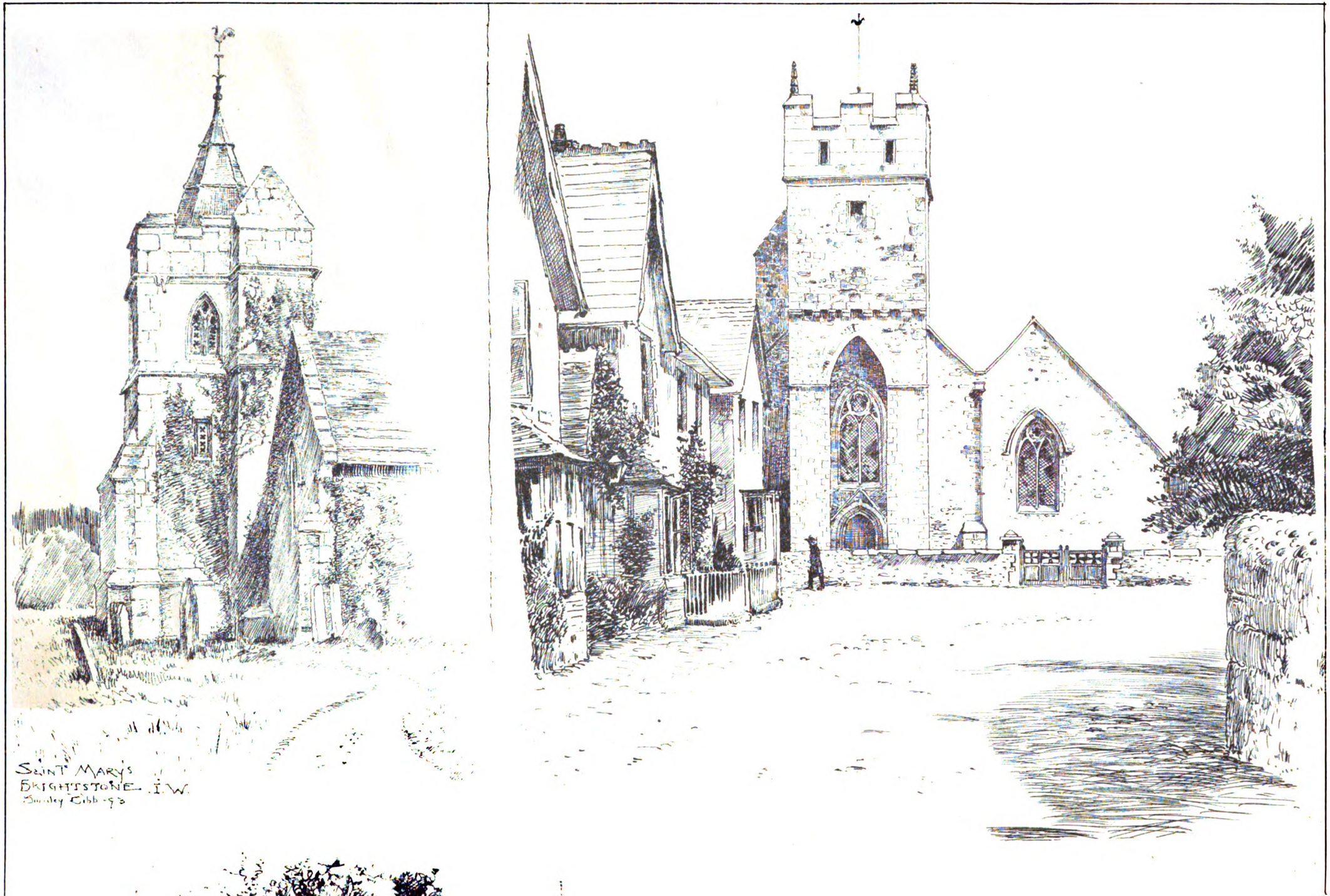
THE "ASPHALEIA" STAGE AT THE BUDA-PEST OPERA HOUSE.

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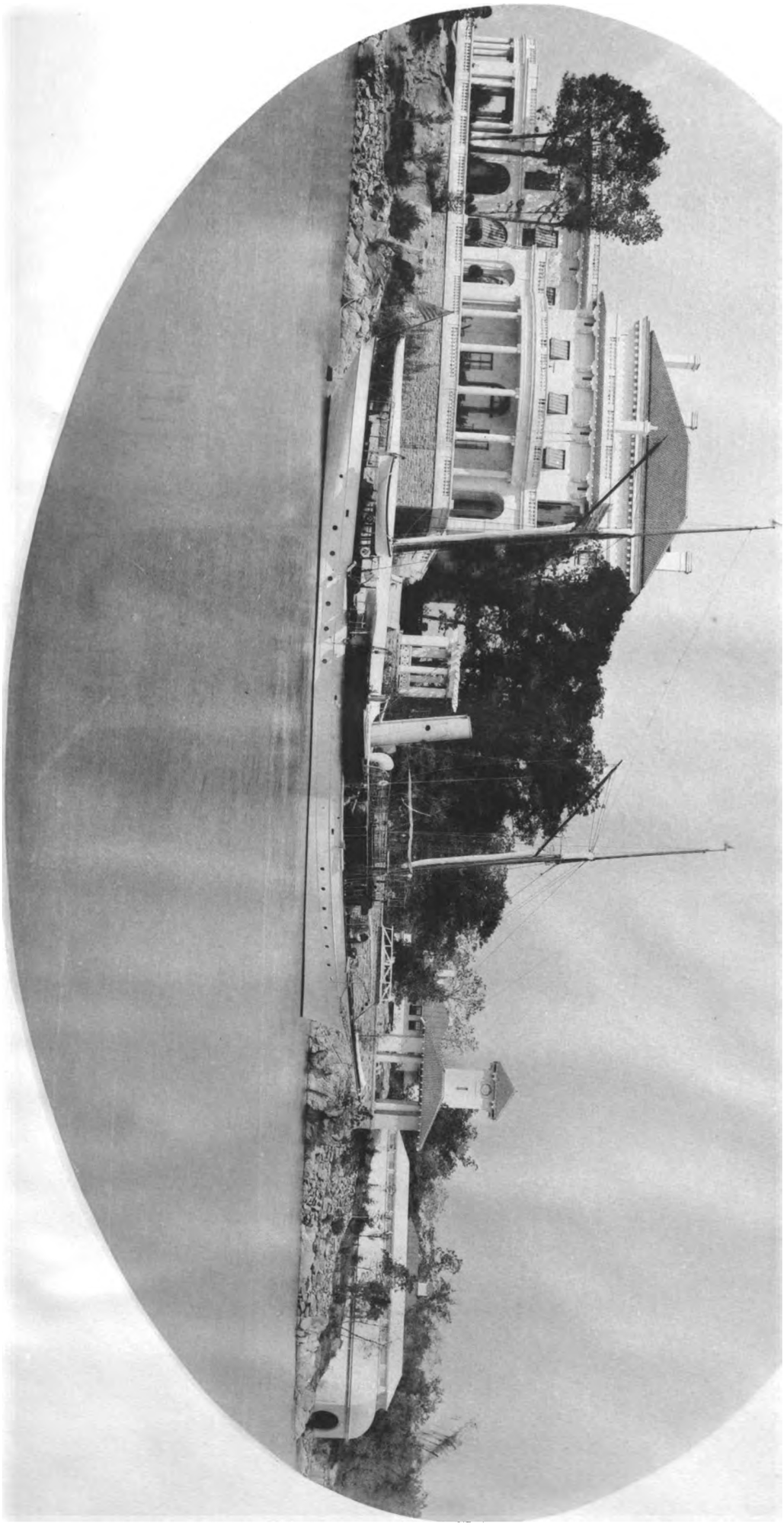


CHURCHES IN THE ISLE OF WIGHT.

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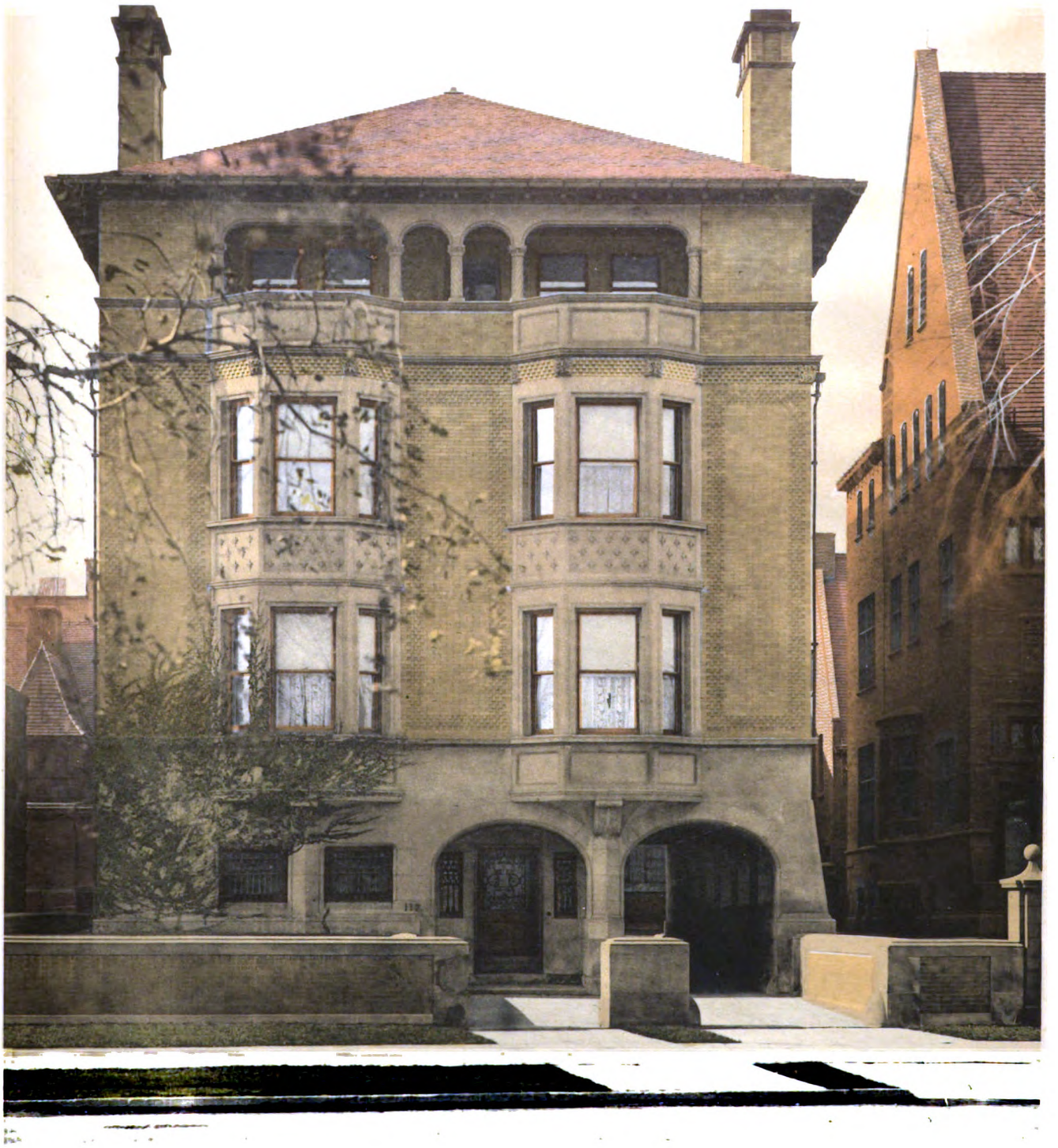
CARRÈRE & HASTINGS, Architects.

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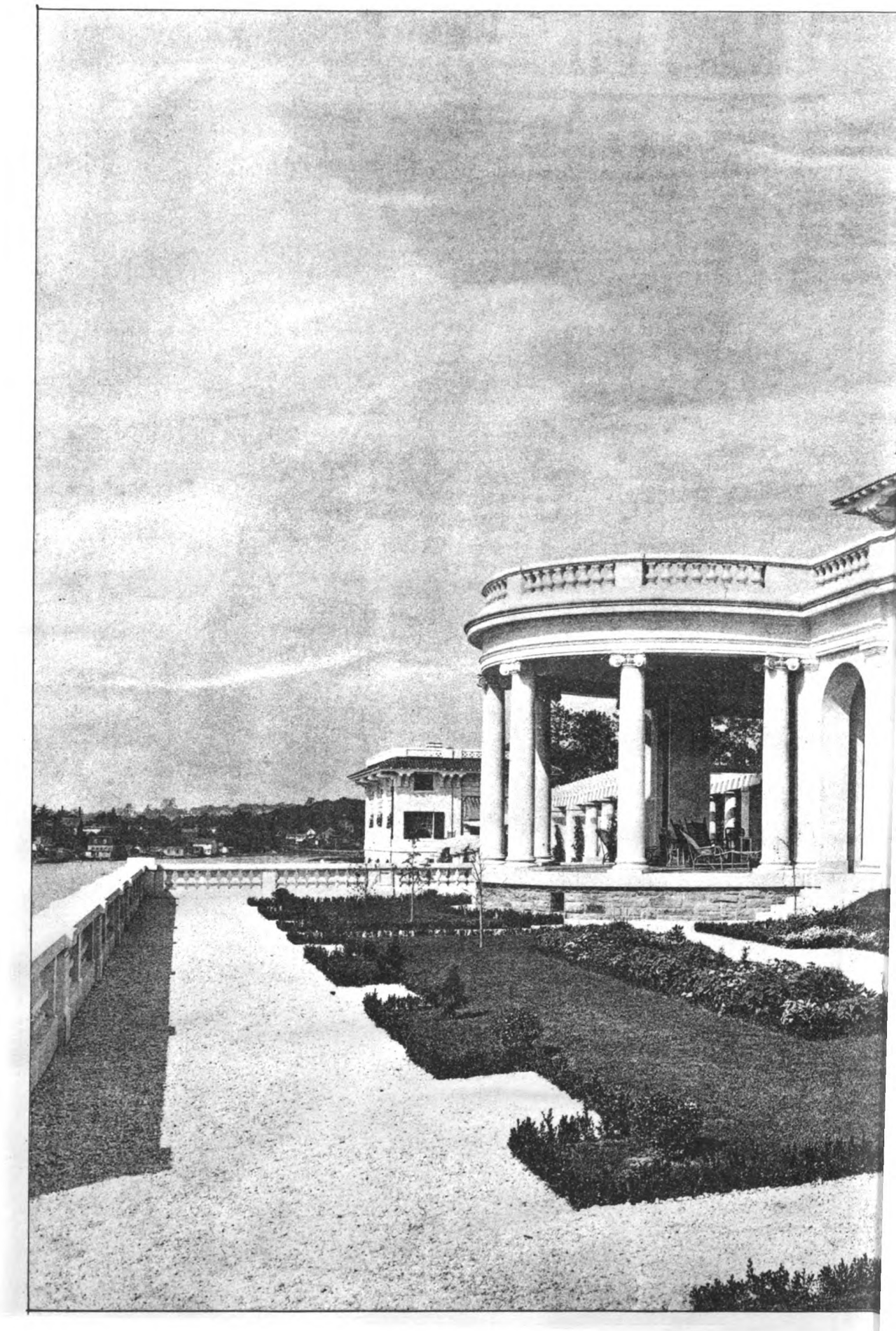
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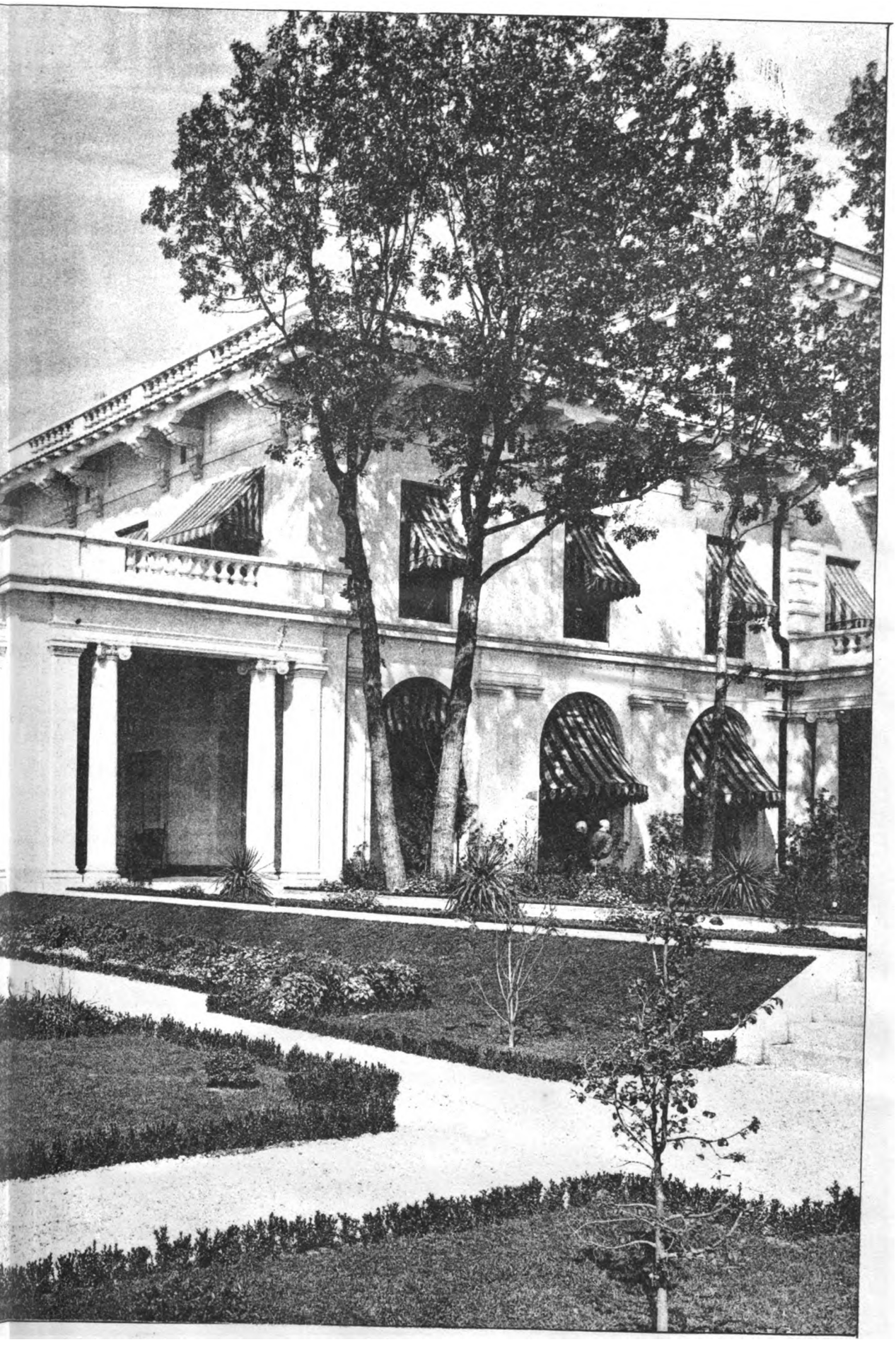
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SOUTHWEST VIEW: HOUSE OF E. C. BENEDICT,

CARRÈRE & HASTIN

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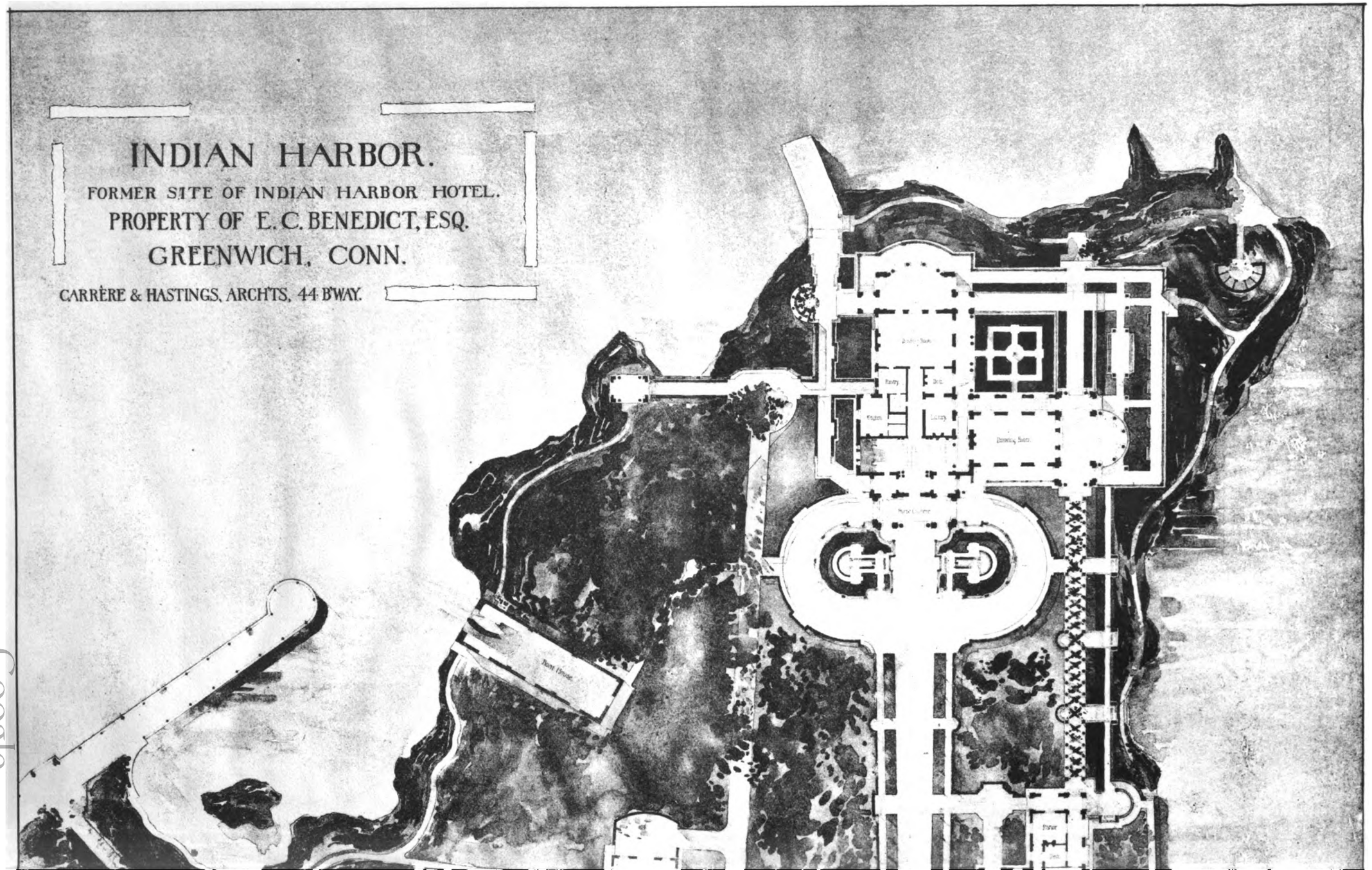
ICT, ESQ., INDIAN HARBOR, GREENWICH, CONN.

STINGS, ARCHITECTS.

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Diagram of Site and Former Buildings.

Showing in Red the outline of property, and the old foundations of Hotel used for present work.

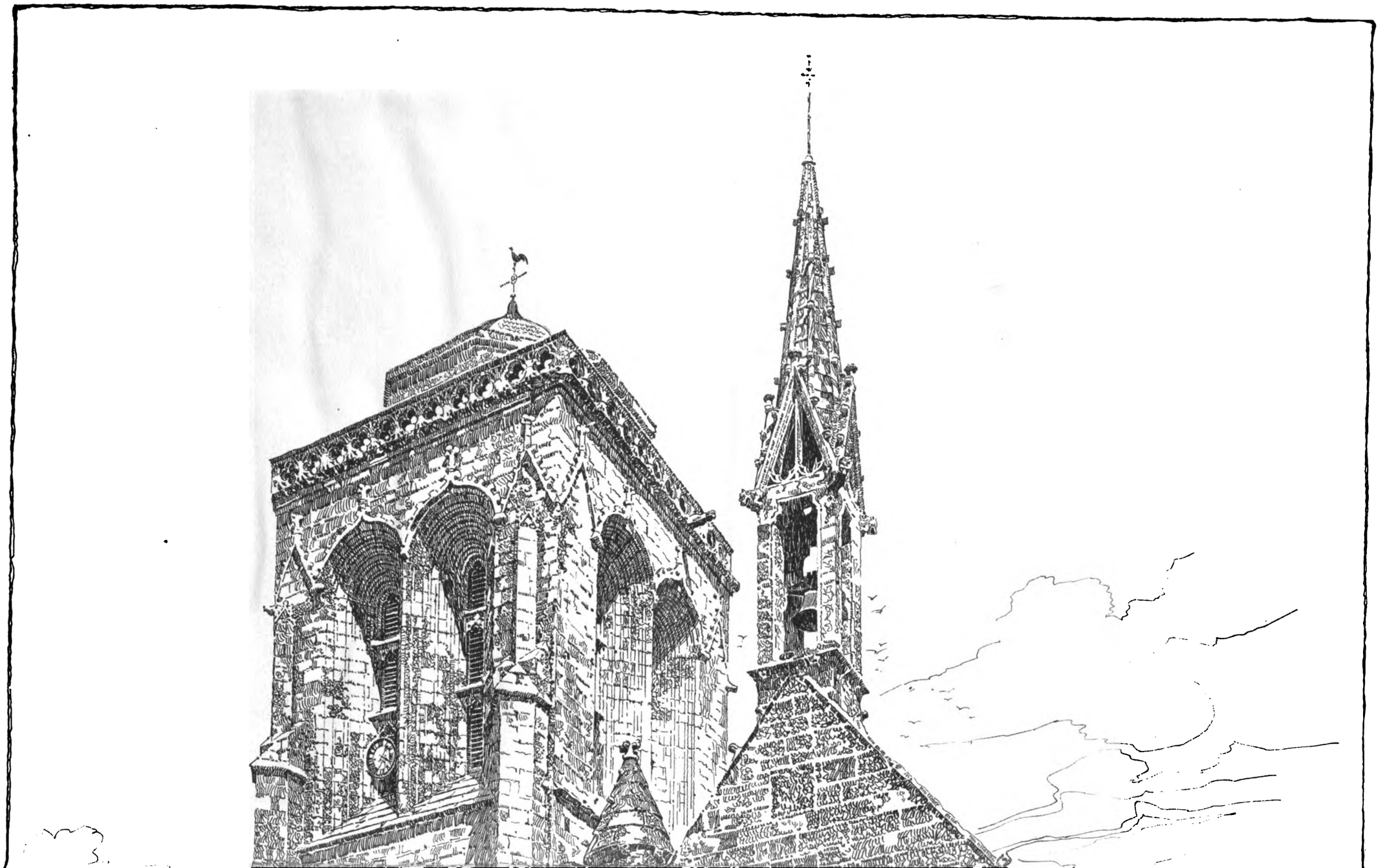
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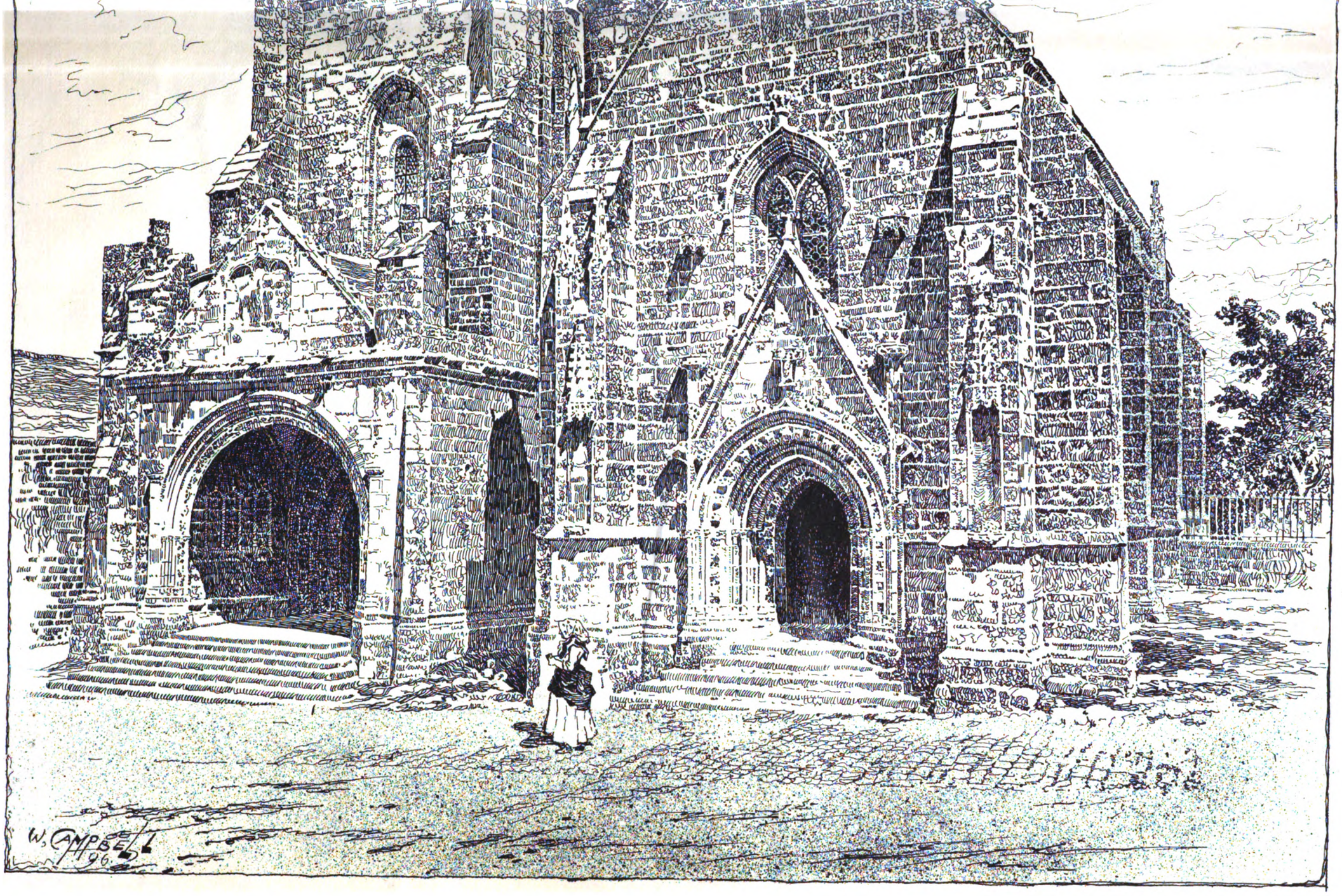
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CHVRCH OF LOCRONAN, BRITTANY.

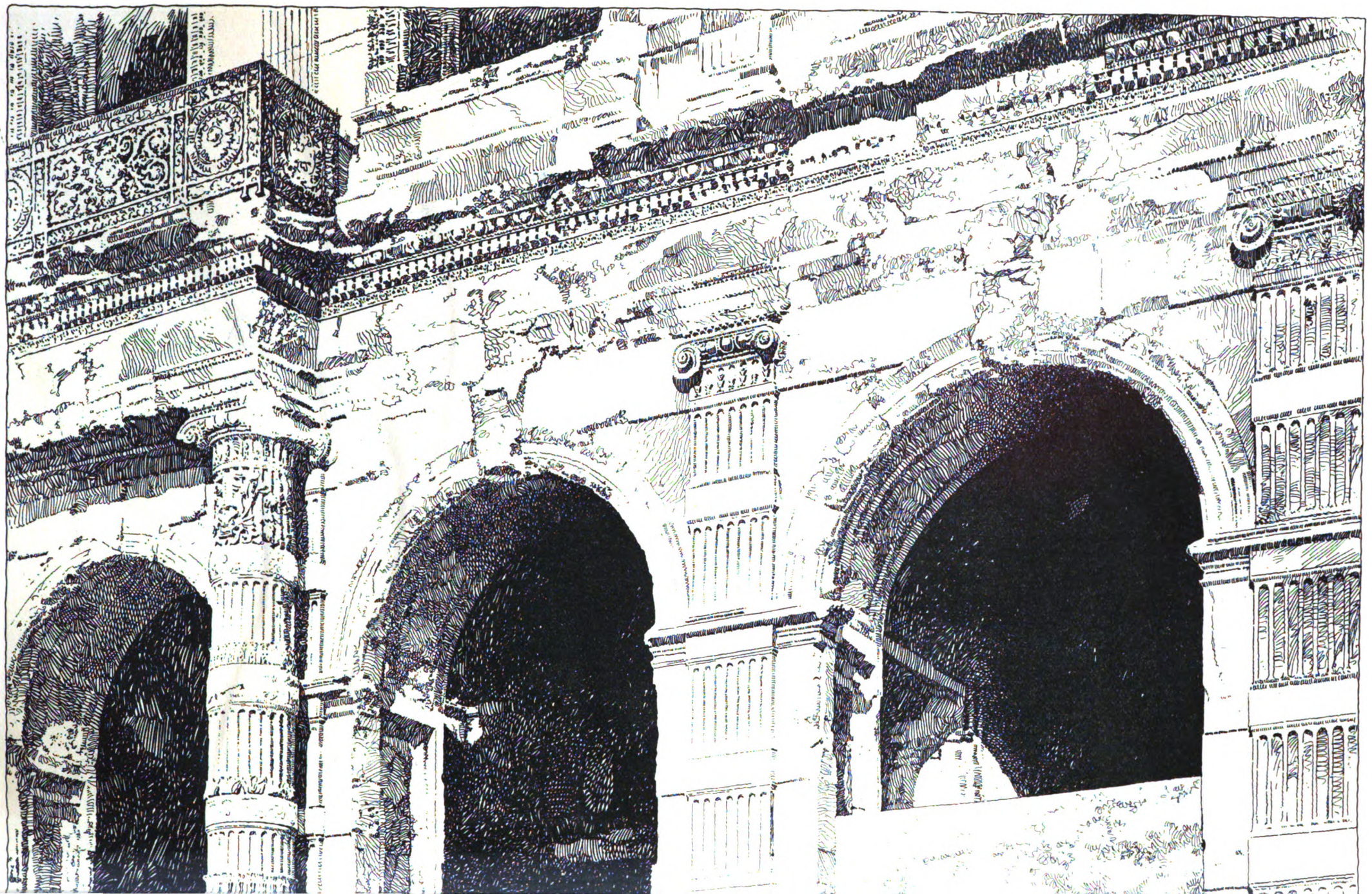
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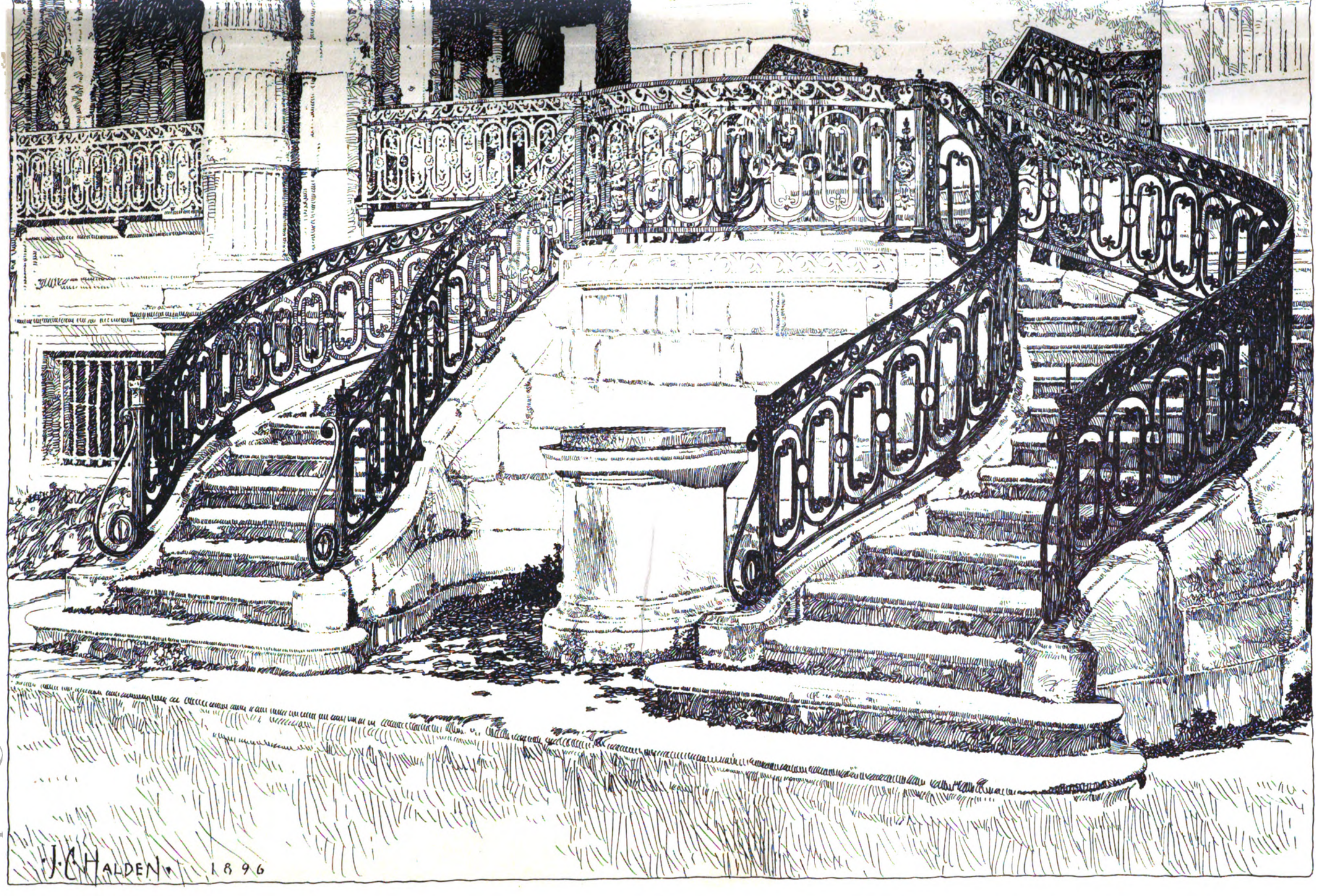
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